HISTORY AND THEORIES OF THE MIND

Neurocognitive Development and Impairments

Series Editor

CSABA PLÉH

HISTORY AND THEORIES
OF THE MIND
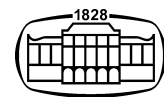
AKADÉMIAI KIADÓ, BUDAPEST

Printed in Hungary

CONTENTS

Modern mind, cognitive architectures and the computer challenge

PREFACE

I have been doing a combination of cognitive science and history of psychology as the essential components of my professional life for almost four decades. This collection of essays covers my varying attempts to find some relationships, if not even integration of these two engagements during the last two decades.

Several unifying ideas characterize these efforts. First of all, it has been my continuous conviction that many of the present-day issues of cognitive research have been articulated in late 19th century, in the early days of psychology as an independent discipline. The dual architecture for cognition proposed by Helmholtz raises conceptual and theoretical issues similar to the ones articulated by present-day debates on modularity. Think of the issue of relatively fixed and flexible representations, the immutability of illusions and the like.

I try to be far from giving a naive historical continuity image of psychological ideas. However, I still do think that knowing about past theories seemingly irrelevant today has a didactical purpose, it supports theoretical reflection on the essential aspects of the cognitive enterprise for present-day students of cognition.

The papers on the Darwinian heritage combine this didactic-historical conviction with one of my essential substantial commitments. I strongly believe that human cognition, and the entire human mind has to be interpreted in an evolutionary manner. Understanding the message of Darwin, Popper, and the like, and combining them with a careful interpretation of Dennett and Dawkins helps to see clearly the conceptual issues involved in trying to find relations between biological and social theories of change.

I also strongly believe that the social theories of cognition, from Halbwachs and Wittgenstein on, have a strong bearing on understanding present-day cognitive science. Societal theories have to be related to present-day evolutionist considerations regarding the architecture of the human mind.

This becomes especially important and relevant when trying to interpret the possible impact of present-day changes in information technology and the workings of the human mind. I am strongly convinced that these changes support a balanced view. New technologies can only shape them to the extent they rely on stable evolutionary architectures.

The exercises on the history of Hungarian psychology can be taken as excursions into how real social forces shape a discipline in a sometimes very authoritative environment.

19TH CENTURY IN THE FORMATION
OF COGNITIVE STUDIES

1. HELMHOLTZ: THE FORERUNNER
OF MODERN PERCEPTUAL RESEARCH

Hermann von Helmholtz elaborated an overall theory of perception that treated perception as a two-level process. On the lower level, there would be an automatic form of reaction in the nervous system that does not yet result in representations. The latter emerge on a higher level of interpretation. This approach became the sometimes unacknowledged foundation of all later information processing and representational (as contrasted to presentational or direct) psychological theories about perception.

Helmholtz combined inspirations from his teacher Johannes Müller with strict and extended empiricist principles. In this view, the basic qualities of sensation are provided by the structure of the sensory apparatus. Even within a given modality, different structural elements would correspond to different qualities. "The qualitative difference of pitch and quality of tone is reduced to a difference in the fibres of the nerve receiving the sensation" (Helmholtz, 1875, p. 148).

As Ernst Cassirer emphasized it several times, Helmholtz was a complex, but serious Kantian in the middle of Hegelianism (and we should add, of an idealist *Naturphilosophie* of life): he was Kantian to the effect that he believed in the cyclic nature of perception, and in the impact of "given organizations" on perception. He was not a Kantian, however, in the sense that he did not believe in the immutability of presumed, *a priori* principles. For him, notions of space and the like were also relative and changeable through experience, some of them being automatized results of experience, some mere conventions.

Certainly, he belonged to the realist trend of interpreting Kant with his belief in the explanation of elementary qualities through the structure of the nervous system. For the rest, he was an empiricist realist. Regarding "higher organizations" of perceptual phenomena, he stops to be a nativist. He suggests that basic qualities of sensations are built into the sensory apparatus and the nervous system. (Again, this is the level that would be referred to by many today as the level of transducers.) Higher moments, however, are all results of experiential factors. Of course, the essential problem is what is considered to be higher. The overall model proposed by Helmholtz is not unlike the standard models of information processing psychology from the 1960s on. Most of these models without ever giving credit to it, repeat the basic tenets of the approach of Helmholtz when they treat perception as a combination of bottom-up and top-down processes. The solutions are different in details, but the basic idea is rather similar. The figure below from Béla Julesz (1991, 1996) shows the present-day relevance of this attitude with clear acknowledgement of the Helmholtzian inspirations.

Of course, today this problem is dissected into several issues: that of automaticity (versus conscious effort), similarity, and innatism. Helmholtz holds a non-similarity based, automatic but still not innate view, which operates with overlearning. This is a rather radical stance. On the one hand, Helmholtz would limit built-in (innate) automaticity to the basics, but would make higher processes (top-down processing) relying on an automatized use of experience, and not a use of conscious knowledge. In this regard, arguably he also made a claim for separating physiological (lower level) and psychological (higher level) issues.
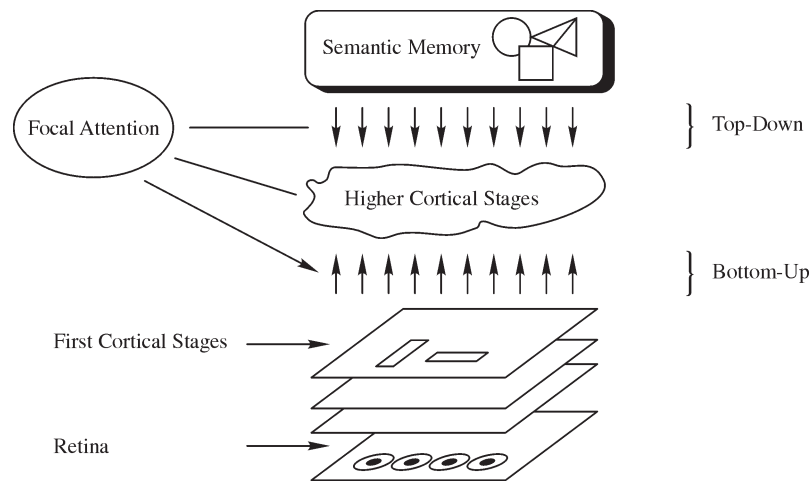
Figure 1.1. A version of dual process approaches to visual processing from present-day psychology (after Julesz, 1991).

Empirism in perceptual theory

Hatfield (1990, p. 284) characterized rather clearly the empirist position of Helmholtz and others regarding perception in his monograph about the history of visual theory. The particular usage of "sensation" and "perception", the empiricist solutions implied are as follows:

> *In its psychological sense, 'sensation' refers to the mental elements of the sensory processes, those elements out of which, by one process or another, everyday perceptual experience arises. In accordance with this usage, an empiristic position is one that minimizes the degree to which our perceptual experience is supposed either to be given directly in sensation or to be derived from sensation by innate processes.*

There are several clearcut issues where Helmholtz stands for empiricism in perception. **Table 1.1** summarizes some of his controversial ideas.

Table 1.1. Some of the controversial empiricist notions introduced
by Helmholtz into perceptual research

Notion	Arguments	Major followers	Major opponents
symbols in perception	percepts are signs	Bühler: sign theory syntactic theory of mind	Lenin: naive iconicity Gestalt: sophisticated iconicity
space based on experience	stereoscopic fusion cataract	perceptual learning Julesz	Hering, Gestalt modern nativists
active role of eye movements	movements essential to perception	Sechenov, Ribot, Jarbus	Gestalt: explanation by fields; movements and attention do not explain
illusions	results of inferences decrease with practice	Boring, Ames demonstrations	Fodor: low-level explanations

Percepts as symbols

There were several critical ideas proposed by Helmholtz in his overall model. The first one was that perceptual representation is enriched by experience without any limits. Second, representations are representations of something only due to their associations and not due to any inner resemblance to the external objects leading to these representations. All sensations are signs, but signs of an arbitrary type.

Helmholtz went along the path of basically proposing a semiotic theory of perception, but his version, unlike that of the British empiricists in their classical times, was totally of an arbitrary type, missing any elements of iconicity. Remember that in classical empiricism, certain qualities, such as form, were primary because they resembled something in the real world. Regarding the percepual representations themselves, Helmholtz believed that "percepts" are semiotically symbolic, i.e., arbitrary in their nature. They are not tied to the world, to the object mirrored by them in relations of an iconic nature (i.e., based on similarity). Thus, he takes a strong stance regarding the issues already raised by Descartes. Descartes claimed that there was a geometric similarity between objects and their representations in the brain. Kirkeboen (1997) even argues that this idea was the first attempt to propose a notion of coding in the nervous system responsible for cognition. Descartes was disturbed, however, by the prospect of having an entirely mechanical system for cognition. Therefore, he outlined a two-level process of perception. The soul or mind would observe these representations provided by the nervous system, and for the soul there would be no geometric isomorphy whatsoever.

Regarding similarity, Helmholtz was rather clear. Representations provided by the transducer system only obtain meaning, they have a reference due to associative learn-

ing: percepts are signs by virtue of experience, not by virtue of any similarity to objects. As Crary (1990, p. 91) mentions it, this was a new theory of non-mimetic relations between external objects and perception. This was not only a threat "of epistemological skepticism about the unreliability of the senses, but a possible reorganization of perception and its objects. … new forms of the real were being fabricated, and a new truth about the capacities of a human subject was being articulated in these terms" (Crary, 1990, p. 92). Crary mentioned the idea of what would happen if one would operate and connect the nerves in new ways, and also how the visual instruments changed the world image. One should add, however, a more abstract impact of this relativity as well: the stance taken by Helmholtz for new mathematical systems of space.

The "symbol theory" of vision is clearly articulated by Helmholtz.

> *Our sensations, as regards their quality, are only signs whose particular character depends wholly upon our own makeup, they are still not to be dismissed as a mere semblance, but they are precisely signs of something.*
> (Helmholtz, 1878/1977, p. 122)

When he talks about experience based on, and connections in our perceptual world, he deliberately uses the analogy of mother tongue: the arbitrariness of the linguistic sign is a hint towards the arbitrariness of all perceptual symbols.

> *[words of the mother tongue] are arbitrarily or accidentally chosen signs – every different language has different ones. Understanding of it is not inherited, since for a German child who was brought up among Frenchmen and has never heard German spoken, German is a foreign language. The child becomes acquainted with the meaning of the words and sentences only through examples of their use. … on growing up, it understands these words and sentences without deliberation and effort, without knowing when, where and through what examples it learnt them.*
> (ibid, p. 131)

The notion of percepts being "merely" symbols had a rather interesting history since then. There is a hidden continuity in the elaboration of the notion of percepts as signs, leading to a semiotic theory of perception. The German–Austrian psychologist and semiotician Karl Bühler (1927) elaborated a semiotic theory of perception. In his view, all perceptual processes should be interpreted from the point of view of signing, and as such, they should be related both to the objects evoking the percepts, i.e., the causal agents responsible for them and to the behavior of others. Linguistic signs are special since they also relate to the supraindividual rule systems responsible for them. The semiotic interpretation of perception is crucial for Bühler in showing that all kinds of behaviors (including the lower levels) necessarily have different aspects.

The other research line that took up the ideas of Helmholtz against naive realism was Pavlov's, especially in his later writings about "signaling systems". While Bühler – and in this respect Helmholtz as well – used the paradigm of language to model perception, in general psychology Pavlov took a reverse route: he starts from perception

14

and elementary learning as a "primary signaling system", and builds up language starting from it as a second signaling system (Pavlov, 1927). Not everybody was happy with this sober and at the same time causal and symbolic approach to the structure of percepts. The most notable critic was ideological, but it expressed a general dissatisfaction with non-transparent ideas regarding the contents of the mind. For Lenin (1927) in his fight against any signs of agnosticism in the communist movement, in his book written after the 1905 failed Russian revolution, the symbol theory of Helmholtz seemed to be agnostic, and with his emphasis on learning he was said to be "denying objective reality and objective truth" (p. 196). Lenin ironically labeled the theory "hieroglyph" theory. At the same time Lenin greeted the causal aspects of the theory, i.e., that the elementary qualities are caused by external events, as a sign of materialism. It is of some interest regarding all naive theories of perception why he was in such a great trouble trying to put Helmholtz in the straitjacket of an ambivalent scientist? The reason is that Lenin could not figure that in a realistic and monistic theory, there is no need for the sideways of a simple and simplicist similarity idea for the anchorage of perception. This issue is not only a problem for naive theories. In the 20th century, Gestalt theory and some newer speculations, like holographic representation face the similarity issue on another level of sophistication again and claim there "has to be" a level in the nervous system where there is isomorphy between objects and their neural representations (Köhler, 1947; Pribram, 1990).

Space perception and empirism

As Bertrand Russell (1897) pointed out in connection with the difficulties of non-Euclidean mathematics, most of mathematics, and especially the issue of space was for centuries the bastion for rationalist theory in the midst of the spread of empiricism. The idea, especially gaining popularity in the Kantian framework, was basically that space, as we conceive it, is a built-in structure of our mind. Several interpretations of this were made in the process of the biologization of Kantian *a priori*. They basically claimed that space as an *a priori* organization is given by the structure and workings of the nervous system. Helmholtz started to seriously challenge this notion, and proposed an empirically-based theory of space that had consequences both for perceptual research and for the foundational issues of mathematics. Helmholtz opened the road for non-Euclidean conceptions of space with his emphasis on the learned nature of space perception. The arbitrary and experience-based connections in perception are used by him as a point of reference in his discussion on the possibility to "imagine" alternative spaces, not only the Euclidean one. He clearly saw that some qualities such as color, are not under the influence of our movements and experience. Others, however, like the ones of a spatial nature are all subject to change under the influence of our experience, and especially of our movements.

  Julian Hochberg (1962) gave an interesting historical summary of the nativist and empirist positions regarding the spatial aspects of vision from speculative philosophy through early experimental psychology and physiology to Gestalt and Gibsonian theories. He also gave a useful taxonomy of which aspects of visual perception were and

are still at stake here: shape, position, size, and depth are the most important aspects of "higher order" perception that relate to space. (Some other critical issues of the debate relate to the explanation of constancy phenomena.) To go into the details of this would be a survey of most of perceptual research. It is enough to say that some of the issues involve the problem: how does our percept gain a spatial reference (and how does this relate to the world), how do we localize things, and how does the two-dimensional retinal image give a three-dimensional representation of the world. There are some issues that are almost the reverse, however: how do we lose some spatial features in the invariant (e.g. size and angle invariant) representation of objects.

Helmholtz and his contemporaries were mainly debating the first types of issues. Hatfield (1993) summarized that the whole issue of spatial moments in perception hides two issues for contemporary interpretation. The first is the original nature of sensations: do they have spatial moments or not, the second is that if they are non-spatial to begin with, how do they get these secondary features: due to innate organization or due to experience. Considering the schema of Julesz **(Figure 1.1.)**, one can think of the second level as either being innately organized or based on experience.

Helmholtz is not merely empirist in the sense that he believes in the impact of experience on our spatial notions. "Unconscious inferences", as well as movements, as two favorite principles of the empirists, are central in his explanation. He most directly takes over notions from John Stuart Mill's idea of an inductive logic. Berkeley and Condillac had already emphasized the importance of touching in spatial perception. Helmholtz wished to claim, however, more: previous associations between retinal signs and touching are used as bases for very fast unconscious inferences.

Helmholtz (1910, p. 533, quoted after Hochberg, 1962, p. 278–279) spells out his intellectualist position rather clearly:

> *The sensations of these senses are tokens for our consciousness, it being left to our intelligence to learn how to comprehend their meaning.*

As Hatfield (1993) points out, Helmholtz assumes local values to retinal signs, but claims that we have to learn how to interpret these. Helmholtz himself combined two factors in explaining higher order perceptual phenomena and especially that of space. One is passive: the impact of memory. The other is active experimentation and searching. Our movements, and especially our eye movements become associated with the local signs coming from the retina. This is how we construct space and depth. All of this goes on like a syllogism in logic. The "rule" that everything on the right side of the retina should be localized to the left is the major premise, and the actual experience of something on the right is the minor premise, the conclusion being that this object is to the left (Hatfield, 1993, p. 549). The importance of movement is twofold: it is hypothesis testing, as in a scientific experiment, but it is also crucial because it is self-initiated, as the first step in the causal chain is available for us (Helmholtz, 1870/1977, p. 136).

Empirism and nativism: Helmholtz and Hering

What is wrong in the nativist views according to Helmholtz? First, he claims that nativism does not explain anything, it merely presupposes what should be explained. Second, and here he is very much a "top-down" psychologist, nativists assume "ready-made representations of objects" (1870/1977, p. 135), while according to the empiricists, the "non-understood", i.e., non-interpreted material of sensations are the basis for the formation of representations according to the "laws of thought". Finally, the only real support for nativist claims would be easy visual orientation in newborn animals. But, Helmholtz claims, this is not enough proven yet. Some of the arguments used by Helmholtz against nativists come from the Molyneux problem. People born blind and operated later to gain sight do not differentiate between objects, and do not see in space. (Of course, this is a much debated issue up to now.)

This notion of perception being penetrated by intellect is a ground for debate ever since. Many in his own time challenged the idea of "inferences". They claimed that the approach taken by Helmholtz makes vision too smart. This criticism was central later on to the approach taken by Gestalt psychology. Gestaltists were basically claiming that all spatial aspects of vision were the results of inborn organization. Köhler (1947, p. 119) specifically claims that the empiristic theory was to save the local value of stimuli. This should be replaced by a contextual theory where the role of retinal stimulation is context-dependent, not due to empirical associations, however, but due to innate organizing factors. Koffka (1935, p. 270) specifically ridicules the empiristic theory of "eye movements", and claims that they should be postulated as being regulated by some given organization.

Floyd Allport (1955, pp. 81–84) was the clearest in criticizing the theory as an example of the "homuncular theories". These might be valid as outside descriptions of the performance of the system, but taken as valid for "the inside" they are postulating either unknown agents "who" make the inferences, or commit the mistake of identifying part of the system with the apparent teleology of the entire system. This could, of course, be said of many other active models. This kind of conceptual criticism is even valid for present-day pandemonium models and the like which identify a multiplicity of agents behind each perceptual performance.

Even today, not everybody is happy with the privileged treatment of Helmholtz. Most of the present-day nativists like Fodor (1983) are very suspicious about the entire idea of top-down interference into perception, without going into the details of unconscious inference. Hacker (1995) however, in a detailed philosophical critique, takes issue specifically with the notion of inference. Hacker basically claims that Helmholtz committed several category mistakes in his treatment of sense data, sensation and perception. One of the faults he finds in Helmholtz is the incorrect use of the notion of inference. Inferences, Hacker claims, only work over propositions, and the unconscious inference schools all the way down to Helmholtz all try to base inferences on sensations.

Certainly, as Rock (1983) also shows it, the starting point for Helmholtz was that where experience enters the interpretations of signs provided by sensation, there was no difference between perception and thought. If we might stretch his concepts, both

belonged to "psychology", while qualia belonged to physiology. Helmholtz believed in the active-inferential nature of perception. The boundaries can be drawn differently, and one could claim that many of his proposed mechanisms, e.g., in connection with the role of eye movements, are partly preprogrammed, and they are not inference-like. In this way, one could disentangle some of the things that seemed to belong together for Helmholtz: the role of experience, the role of active movement, and the role of thought in perception might prove to be separate claims, with separate domains of validity. The books by Rock (1983) and Hochberg (1978) give balanced treatment of these issues, and so does the 1993 special issue *Seeing and Thinking* of the *Italian Journal of Psychology*.

The question of space is a crucial example here. However, Helmholtz was extending his empiristic theory to all perceptual phenomena. For hearing, he claimed that the theory of pitch has to be supplemented by a theory of music. However, this latter one is already a domain of psychology and esthetics. (Needless to say, he contributed to this quite considerably.)

Nature and natural science give constraints here, but otherwise there are cultural and psychological variations present: they are explorations of the space of possibilities.

> *The system of Scales, Modes, and Harmonic Tissues does not solely rely upon inalterable natural laws, but is also, at least partly, the result of esthetical principles, which have already changed, and will further change, with the progressive development of humanity. …*
>
> *But it does not follow from this that the choice of those elements of musical art was perfectly arbitrary, and that they do not allow for being derived from some more general law. Scientific esthetics have to deal with the psychological motor: scientific physics with the technical.*
> (Helmholtz, 1875, p. 235)

One last word of warning is at place here. Helmholtz was not as naive as many of his critics claim. He clearly saw that calling these processes *a conclusion* is only valid for the results, not necessarily the process, and he also clearly differentiated these unconscious, automatized but experience-based effects from those of knowledge in the abstract sense.

> *The psychic activities that lead us to infer that there in front of us at a certain place there is a certain object of a certain character are generally not conscious activities, but unconscious ones. In their result they are equivalent to a conclusion, to the extent that the observed action on our senses enables us to form an idea of the possible cause of this action. … But what seems to differentiate them from a conclusion … is that a conclusion is an act of conscious thought. … Still it may be permissible to speak of the psychic acts of ordinary perception as unconscious conclusions, thereby making a distinction of some sort between them and the common so-called conscious conclusions. … [t]here has been a measure of doubt about the similarity of the two cases, there can be no doubt as to the similarity between the results of such unconscious conclusions and those of conscious*

conclusions. … because they are not free acts of conscious thought, these uncon-
scious conclusions from analogy are irresistible, and the effect of them cannot be
overcome by a better understanding of the real relations.
(Helmholtz, 1866/1924–25/1974, pp. 101–102)

2. ERNST MACH AND DANIEL DENNETT:
  TWO EVOLUTIONARY MODELS
  OF COGNITION

Evolutionary traditions and present-day cognitive trends

In the present stage of development of cognitive science, the functionalism of the formerly received view that had no clearcut biological interpretation seems to fade away. Several types of biologically-oriented interpretive models move to center stage. In this context, it is becoming quite relevant and interesting to search for historical parallels and inspirations of biological interpretive models, in the same way as it was done for computational models with reference to Kant, Hume, and even Plato (see about some of them Brook, 1994, and the volume edited by Smith, 1990), not to talk now about Cartesian models.

One of the leading contenders for the role, if not for a New Synthesis, at least for a new inspiration for research, is the evolutionary conception of Daniel Dennett (1987, 1991a, 1994). Some of his basic ideas to concern us in this respect might be summarized as follows:

(1) Some of our cognitive achievements are related to attitudes, to stances towards the world like the intentional stance (Dennett, 1987) that are "soft" in the sense that they can be given an instrumental interpretation.
(2) We are entitled to use them because they work pragmatically.
(3) This pragmatic feasibility is related to the fact that they were formed in our evolutionary history (Dennett, 1991a, 1994).
(4) There are no mysterious or essentialistic static points or preset certain goals neither in the structure and processing of the mind nor in its evolution.
(5) Self and consciousness are not fixed starting points and identifiable inner places. Rather, they are shifting abstract entities like gravitational centers which are useful for our orientation.

I intend to show that a point of view similar to this both in its structure and content was formed a hundred years ago in the first enthusiasm over the philosophical relevance of evolutionary theory. It has become customary today to rediscover the importance of evolutionary theory for turn-of-century psychology and philosophy. We have a constant emphasis in the work of authors like Richard Rorty (1982) of the role of the non-finite nature of our human universe and its relationship to evolution and democracy in pragmatic authors like Dewey (1910). There is a well-known continuous albeit socially many times challenged tradition of looking at individual differences from an evolu-

tionary perspective. There is a third historical trend, however, that deserves some attention. This is the early evolutionary interpretation of questions of epistemology and mental organization. This tradition entails a belief in the evolutionary interpretation of our internal representations, preferences, and even concepts. Historically two types of approaches can be observed in this field. One was the straightforward motor adaptationist interpretation of mental life. The mental world in higher animals would be a direct derivative of motor adaptations. This showed up in the early motor theories of perception and consciousness, in authors like the French Théodule Ribot, with his motor theory of perception, the Russian Sechenov, with his notion of inner inhibition (all mental phenomena would be of a reflex nature with the efferent part of the reflex inhibited) and the Hungarian Jenő Posch, with his motor theory of the mind inspired by Spencer. The interest and importance of Ernst Mach for evolutionary theories of cognition lies partly in the fact that he tried to give a Darwinian interpretation of mental life without binding it to a peripheral motor theory. For him, the inner world, the world of experience is a starting point, and he intends to show that this inner life can be given a non-essentialist functional interpretation. Leszek Kolakowski (1968, p. 155), in his treatment of positivist philosophy, gives a summary of the views of Mach and other empiriocriticists in a way rather similar to the characterization of Dennett we started from:

> *we are especially struck by the following features [in Mach]: (1) the philosophical destruction of the subject; (2) the biological and practical conception of cognitive functions, reduction of intellectual behavior to purely organic needs, and renunciation of 'truth' in the transcendental sense; (3) desire to get back to the most primitive concrete datum, to a 'natural' view of the world not mediated by metaphysical fictions.*

Elementarism and the unity of science in Mach

Ernst Mach was a key figure in first trying to interpret Darwin with reference to issues of epistemology and the then newborn experimental psychology of consciousness or content, of which he was an early champion. Mach, the archipositivist, believed in the unity of science. For him, however, this was based on the unity of experience, on the fact that the starting point for all sciences (physics and psychology included) is experience taken neutrally. (Blackmore, 1972, shows what influence this had on Russell's neutral monism.) There is no principal difference between psychology and physics: all start with experience, he claims in his famous "antimetaphysical remarks" (Mach, 1897), but in considering them in themselves, we are doing physics, while in interpreting them as related to the body, we are studying sensations. Physiological psychology in this process becomes a part of physics. There is no conceptual boundary between the two. This idea was not entirely new. Varieties of this duality of attitude approach to the relations between traditional natural science and psychology were provided by Wundt and his followers. Interestingly enough, while Mach basically never

quotes Wundt, some of the most systematic students of Wundt, like Külpe and Titchener rely heavily on Mach in their systematic treatments. (See Blackmore, 1972.)

> *The traditional gulf between physical and psychological research … exists only for the habitual stereotyped method of observation. A color is a physical object so long as we consider its dependence upon its luminous source, upon other colors, upon heat, upon space and so forth. Regarding, however, its dependence upon the retina … it becomes a psychological object, a sensation. Not the subject, but the direction of our investigation, is different in the two domains.*
> (Mach, 1897, pp. 14–15)

This implies an interesting attitude towards one of the basic debated issues in contemporary cognitive studies: the issue of qualia. On the one hand, Mach would align himself together with those who deny that qualia pose any special problem (he would go along with Dennett, 1991a), but his claim for unity would be based on a neutral but still inner, experiential unity: qualia are not a special issue because physics also starts from inner experience.

> *Consciousness is not a special mental quality or class of qualities different from the physical ones; nor is it a special quality that would have to be added to physical ones in order to make the unconscious conscious. … Consciousness consists not in a special quality but in a special connection between qualities.*
> (Mach, 1976, p. 31)

This monistic attitude is combined by Mach with a thoroughgoing elementarism and sensationalism. "All bodies are but thought-symbols for complexes of sensations" (Mach, 1897, p. 23), he warns the physicist. "The *elements* form the real, immediate, and ultimate foundation. … For us, colors, sounds, spaces, times, … are the ultimate elements …" (ibid, p. 23).

Recently, Porter (1994) pointed out again that the antiessentialist moment and the alienation from any kind of "substantialism" in Mach lead to further developments towards a social view of science in the work of Pearson (1892). Pearson, besides proposing a view of science that replaces causality with correlation, also emphasized that the scientific enterprise should lead to a decentralization of the knowing subject, and to a treatment of knowledge only as a cross section of impersonal social factors.

Economy as an explanatory principle of reduction and its relation to evolution

That part of Mach, i.e., his elementarism and the kind of pre-phenomenological but still phenomenal monism is fair enough. It has some negative consequences for his view of the physical world. As Čapek (1968, p. 189) put it, he is too certain in the phenomenal view of the world and too Spencerian in his attitude, that is why he is unhappy

with the "non-phenomenalistic features of 20th-century physics". This attitude would be reconcilable with a general (uninterpreted) positivist unified science view. Mach, however, enters evolutionary considerations to the scene in several ways. His "biological view of knowledge" basically holds that "the cognitive functions of the human mind are not static and immutable entities but, like all other physical and physiological features of man, are subject to gradual growth and development" (Čapek, 1968, p. 172). The key to his evolutionary deductions is his *Principle of Economy*. That is the reason why William James has such a high regard for him. Interestingly enough these are the aspects where Mach was not a neutral pragmatist: for him, it was essential to connect pragmatic considerations to his biological views (Blackmore, 1972, pp. 126–28, 176–77).

Blackmore (1972, pp. 173–179) differentiated 11 different uses of this principle by Mach (see also Kallfelz, 1929). Basically, the uses relate either to economy in doing science, or to economy in our everyday cognition. Whatever concepts work in the mind, they work because they pay off, they are more economical than other solutions would be. In order to connect this to evolutionary theory, you must of course have an underlying presupposition. "Mother Nature" is not only a Blind Watchmaker but a stingy one as well, she never does anything superfluous. This effort to connect economy to evolution is conceptually a non-trivial move. As contemporary arguments about the non-optimal nature of the design of the living indicate, the structure of living beings is not optimally economical from an engineering perspective (see for a summary Clark, 1989). The commitments of Mach to connect the two are conceptually weak, but they lead him to some interesting propositions regarding the evolutionary origin of some specific cognitive tools.

According to Mach, our concepts that are treated in a realistic way are somehow economic shorthand symbols. The adaptationist principle is part of not only biological evolution in the strict sense, but the world of cognition or the mind as well. Our mental world works with hypotheses that are accepted because they work, they lead to acceptable solutions. Mach is among the first authors to make the idea of selection enter the mental realm with his peculiar use of the economy principle. "Physics is experience, arranged in economical order" (Mach, 1910, p. 197).

Mach goes further, however. Economy as a pragmatic evolutionary criterion is not only true for our everyday concepts, but it is the driving force behind scientific progress as well. The writer Robert Musil (1982) summarized this aspect of Mach rather clearly in his dissertation on Mach. He even pointed out some troubles that can be projected to the contemporary pragmatist interpretation of the economy principle. One interpretation would be that it is a description of scientific progress, the other is a principle of epistemological skepticism and relativism.

> *There would then be no solid, so to speak absolute truth but only truth which is relative in the sense that any opinion will count as true provided it fulfills its purpose of providing adequate orientation. In other words, there is no truth at all in the authentic sense but on a practical convention contributing to self-preservation.*
(Musil, 1982, p. 26)

This uncertainty, this lack of a stable reference point was the most troubling feature of Mach for Lenin (1927). Whenever he mentions the principle of economy, he downgrades it as a circular and subjective notion. It is very telling that this supposedly doctrinaire materialist book never mentions evolutionary theory, neither in connection with Mach nor in other contexts.

The Darwinian interpretation of the Principle of Economy in Mach shows up most clearly in two respects. In several of his technical writings – including the *Contributions to the analysis of sensations* – he presented an evolutionary image of several aspects of sensory representation, including colors and dimensions of space perception. The logical structure of his argumentation is rather interesting even for present-day cognitive studies. In accordance with his general monistic commitments, he believes in a total psychophysiological parallelism: for each aspect of sensory experience, there is a corresponding physiological structure. That structure has to be explained by evolutionary considerations, in turn, as an adaptation to the environment. Thus, in principle, Mach claims a dual biological anchorage for the mental: not only a short-range physiological, but a long-range evolutionary account as well (Mayr, 1982). This would explain several factors in human intellectual history. Our first interest in geometry, for example, would come from the structure of our nervous apparatus dealing with space. And in that apparatus, the primacy of straight line would be explained not by frequencies in individual experience but by the fact that the straight line gives minimum deviation from the mean values of depth. Seeing straight lines would require the least effort and thus would comply with the Principle of Economy.

As for the course of research, we might very well start from "teleological considerations" about the goals of the organism, and so on, but we have to keep in mind that this does not yet give us a causal explanation. The final causal explanation must always be a physical one that has to take over from teleological and historical considerations (Mach, 1897, Chapters IV and V). This image of the relationships between levels of organization and levels of explanation resembles in many aspects the relationship between "the stances" as proposed by Dennett (1987), and some of the adaptationist interpretations in "evolutionary psychology" (see the volume edited by Barkow, Cosmides, and Tooby, 1992). In later editions of the *Analysis,* and in his work on the psychology of discovery (Mach, 1976), he is very considerate of the work of Lloyd Morgan (1894), the comparative psychologist whose famous Canon (if you can explain some behavior with a simpler mental organization, you are not entitled to attribute the more complicated one to the given species) has become an extraordinarily important version of the economy principle both in doing science and in creating behaviorist psychology.

Mach also takes an adaptationist, biological view of science. In his acceptance speech as Rector of Prague University, he claims that everything is part of a universal process of evolution with positive connotations of progress.

> *We are prepared, thus, to regard ourselves and every one of our ideas as a product and a subject of universal evolution.*
> (Mach, 1910, p. 235)

There is a unified science due to the common subject matter. But there is a unity over simple biological adaptations and science as well due to the attitudes represented.

> *Expressed in the most concise terms, the task of scientific inquiry consists in adapting thoughts to facts and thoughts to one another. Every beneficial biological process furthers self-preservation, and hence is a process of adaptation. ... For the physical, biological behavior of living beings is co-determined, and supplemented, by the inner processes and thinking.*
> (Mach, quoted from Kolakowski, 1968, p. 145)

There is so much unity of approach that in an ironical footnote, Mach himself (1897, Chapter 1, p. 15) reminds us that due to its adaptive nature, our thought is sometimes at the mercy of our most worldly interests such as nationalism or class interest, etc.

There is one aspect of the evolutionary ideas found in Mach that specifically deserves a mention: the idea of an intentional stance applied to our fellow humans. The whole issue of using intentional, design-related (teleological) and causal explanations in general is discussed in detail in the *Analysis* (Mach, 1897, pp. 68–69). In the same book, he argues in the first chapter for an analogical knowledge of other minds.

In his popular scientific talks, he elaborates this line of thought further: "We predict in thought the acts and behavior of men by assuming sensations, feelings, and wills similar to our own connected with their bodies" (Mach, 1910, p. 207). The above attributions do appear early on: "every child unconsciously accomplished it" (ibid, p. 208). This would certainly place him along the so-called simulation theorists today, regarding the origin of our theories of mind in contrast to the "theory theories", but it still shows how important the whole issue of what is the basis for attributing mentality was for Mach. In comparing him to Dennett, the latter author along with his moving away from the centrality of the Ego would treat even self-knowledge in an inferential way rather than to be a starting point as it was for Mach. (I owe this observation to György Gergely who has written influential experimental and conceptual papers on the present status of these debates, e.g., Gergely, Beckering and Király; 2002, Gergely, 2003.)

The dissolution of the Ego concept

Mach returns several times to the Humeian issue of the disappearance of the Ego as a stable starting point. He treats this both from an internalist perspective, as an impressionist image of the mind: the mind is but "a bundle or collection of different perceptions" (Hume) (see a philosophical presentation of this aspect of Mach in Kolakowski, 1968; Nyíri, 1992). "The primary fact is not the I, the Ego, but the elements (sensations). The elements *constitute* the *I*. ... when *I* die. ... only an ideal mental-economical unity, not a real unity, has ceased to exist" (Mach, 1897, pp. 19–20). Notice the same half-tragic, half-ironical preoccupation with the issue of how one can assure the survival of one's thoughts if one does not believe in the immortal and timeless soul as it appears in some writings of Dennett (e.g., 1990) and of course in Hume, who claimed that we cease to feel and think with the death of the body.

The dropping of the centrality of the Ego also reduces our epistemological dualism and our scientific vanity. It is indeed related to the ideological monism so dear for Mach.

> *As soon as we have perceived that the supposed unities 'body' and 'Ego' are only makeshifts, designed for provisional survey and for certain practical purposes, we find ourselves obliged, in many profound scientific investigations, to abandon them as insufficient and inappropriate. The antithesis of Ego and world, sensation (phenomenon) and thing, then vanishes, and we have simply to deal with the* connexion *of the* elements.
> (ibid, p. 11)

On the other hand, and that is where the dissolution of the notion of the Ego or self into the elements takes up a biological flavor, he connects this Humeian reasoning with the economy principle and with evolution. The Ego or self is a practical, economic concept: we live by it, but the real analysis shows it to be only a "hypothetical entity" ("a practical *unity*, put together for purposes of provisional survey", Mach, 1897, p. 21). It is a soft abstraction, like the ones so dear for Dennett, the notion of Gravitational Center, or the Equator (Dennett, 1987). And its use is based on function rather than essence. Its ontological status is similar to the relationship between the intentional stance and the microanalysis of consciousness in Dennett (1991a). It is not a mere illusion, but something derived and postulated: "The Ego: it consists of memories of our experiences along with the associations provoked by them" (Mach, 1910, p. 46).

This soft concept of Ego with which we have to live, without taking it to be an ontological starting point, has two kinds of anchorages for Mach. The first comes from our general tendency to abbreviate repeated complexes of sensations with names, which appears in our notion of physical bodies as well. "That which is perceptually represented in a single image receives a *single* designation, a *single* name" (Mach, 1897, p. 3). At the same time, we should not overemphasize the unity of consciousness. "The so-called unity of consciousness is not an argument in point. … a rich and variously interconnected content of consciousness is in no respect more difficult to understand than a rich and diversified interconnexion of the world" (Mach, 1897, p. 2). Our feeling of the self is only a relative, experiential unity and not a real one. Mach holds an attitude rather similar to the one taken by Dennett and Kinsbourne (1992) in their argumentation about the illusory nature of the unified Cartesian Theater.

The other anchoring point is found by Mach in the concept of body. Here, Mach reiterates and modernizes an idea already apparent in the work of Condillac, and later on taken up by several theories both in comparative and in clinical psychology (Henry Head, Frederick Bartlett) that take the body schema, the representation of our body as central to the self concept. "As relatively permanent, it is exhibited, further, that complex of memories, moods, and feelings, are joined to a particular body (the human body), which is denominated the 'I' or 'Ego'" (Mach, 1897. p. 3).

It is worthy of note that this centrality of the notion of body image has not disappeared. It is certainly textbook material in psychology and it is seen in neuropsychological theories. Antonio Damasio (1994), in his work on the representation of emotions and their role in the shaping of our goal system, claims that the emotionally laden

representation of our body is the central core to our self concept. Dennett (1991a) in his view on consciousness also gives a central role to the body image in the reduction of our notion of the self.

There is one emphasis where Dennett diverges from Mach. The narrative sources of coherence did not yet appear in Mach. This is indeed a great difference and a sign of the times: for all of their similarity, the present-day dissolution and reintegration view goes along with the narrative metatheory, while for Mach the same function was achieved merely by opting for the body image. Dennett (1991a, pp. 426–427) puts it rather clearly:

> *A self, according to my theory, is not any old mathematical point, but an abstraction defined by the myriads of attributions and interpretations (including self-attributions and self-interpretations) that have composed the biography of the living body whose Center of Narrative Gravity it is.*

For Mach, it was important to put his entire treatment of the self or Ego into a cosmic perspective. This is clearly another feature that differentiates him from present-day treatments. Here he shows characteristics of his own time. He cultivates a Spencerian belief in evolution as progress, which as Čapek (1968) clearly shows, would hardly appear in present-day evolutionary epistemologies. This was related to Mach's desire to overcome the traditional duality in epistemology and also, as Blackmore (1972, pp. 286–289) observes, to his interest in the Buddhist type of unity of mind and the world. Mach puts his commitment into progressive, enthusiastic phrases: "We are prepared, thus, to regard ourselves and every one of our ideas as a product and a subject of universal evolution" (Mach, 1910, p. 235). He phrases the same thing in a more withdrawn and reluctant way: "We feel that the real pearls of life lie in the ever changing contents of consciousness, and that the person is merely an indifferent symbolic thread on which they are strung" (Mach, 1910, pp. 234–235). But both attitudes give a consolation to life. They do not merely give a cold and dispassionate scientific solution regarding the problem of the place on man in the world. They provide us a feeling of connectedness.

> *If the Ego is not a monad isolated from the world but a part of it, in the midst of the cosmic stream from which it has merged and into which it is ready to dissolve back again, then we shall no longer be inclined to regard the world as an unknowable something.*
> (Mach, 1910, p. 361)

The relative stability approach taken by Mach to the issue of the Ego makes his views rather similar to the views of Dennett. Similarly do, so the idea of an evolutionary explanation, the fact that abstract notions like that of the self have a functional story and they are evolutionary hypotheses. All of our knowledge is always tentative and hypothetical. They both claim that in the final analysis, there are only elements in our mind as well as in the world, but out of those elements evolutionary working hypotheses are being formed.

28

Neglect and impact of Mach

There is very little presence of Mach felt on the cognitive scene. This is true regarding the philosophical interpretations of evolutionary theory as well. Even very considerate authors like Ruse (1986) when they trace the philosophical implications and usage of Darwinian ideas, entirely forget about Mach (to be sure, they also forget about Piaget or about the early work of Dennett as well). There are three aspects that make him worthy of studying and not only for the antiquarian historian of ideas. He started a remarkable tradition of treating issues of epistemology and the psychology of cognition, issues of ordinary cognition and making of science together. Lana (1976) is one of the exceptional present-day historians of psychology who noticed the importance of this fact. This continuity between epistemology and psychology is also true for almost the entire present-day cognitivism: there is no dividing line between science and ordinary cognition. The unity of the two is provided by Mach in an evolutionary framework. That is true more or less for the approach taken by Dennett, too. And the interesting mediator, as Dennett (1994, 1996) acknowledges it in some of his newer writings, is the evolutionary epistemology tradition of Popper (1972, 1994), and his followers like Campbell (1974). Similar ideas show up even in Quine (1969, p. 90) when he allows for "epistemology the resources of natural science".

One of the specific ideas central to Mach and reappearing in Dennett is the complex thought that evolution can explain behavior without making you into a "muscle twitch behaviorist". This way of thinking was taken up by other Viennese scholars. In the work of Karl Bühler (1922, 1927), a teacher of Popper, two crucial aspects appear that create a continuity from Mach to Dennett. The first is the whole notion of carefully continuing the Darwinian path and studying behavior patterns and stimulus preferences as the results of evolution. Konrad Lorenz, himself a student of Bühler, through the elaboration of comparative ethology, transmitted this idea up to the present-day concern with evolutionary explanations for more inner aspects of cognition. The circle that started with the evolutionary considerations of the "subjectivist" Mach is thus closing up. As part of the extension of selectional explanations to different domains, Bühler (1922) also extended the idea of Mach (1905/1926) of seeing hypothesis and trial everywhere. According to Mach, hypotheses and trials characterize not only science, but all our everyday cognition. Bühler proposed a continuity between instinct, trial-and-error-learning, and intellect. His student, another Vienna philosopher, Karl Popper (1963, 1972, 1976, 1994), in his evolutionary epistemology extended this idea by claiming that a hypothesis–test–selection sequence is observed everywhere. When Campbell (1974) summarized the 10 different levels of use of the-trial-and-selection notion along the lines of a Popperian evolutionary epistemology, from the trials of the paramecium to science, Mach gained a central position on his historical tableau. Bühler (1922) proposed a threefold selection field: instincts, habits, and intellect for child development. Through the mediation of Popper these correspond roughly to what Dennett (1994, 1996) calls Darwinian, Skinnerian and Popperian creatures.

By emphasizing the beginning of some of the very ideas and a whole style of philosophizing in Mach, I do not intend to deny originality to present-day cognitivists, or to Dennett to that effect. I only wanted to show that there is another Vienna tradition,

not only the one Quine (1969) refers to, which latter one it would separate natural science and philosophy by restricting the latter to the study of language. This integral tradition also comes from the neighborhood of Vienna and it continuously finds an alliance between philosophy and natural science under the metatheory of evolution. There is a rather important and remarkable difference, and that is where the two Vienna traditions meet today. Mach, in his evolutionary approach to cognition was missing the logical structure of cognition. What we have today in the work of Dennett and others is a meeting of the Frege–Russell–Vienna traditions with the Darwinian traditions so clearly exposed by Mach.

3. POSITIVE PSYCHOLOGY TRADITIONS IN CLASSICAL EUROPEAN PSYCHOLOGY*

The aim of this chapter is to show attempts of nineteenth- and twentieth-century European psychology that can be regarded as predecessors of present-day positive psychology. To see this in context, I would like to present an overview of modern European epistemological predecessors of this positive psychology tradition. Basically, there are four topics to be highlighted in this excursion:

– self-rewarding motivational systems versus utilitarianism,
– the theory of John Stuart Mill on the significance of knowledge and love,
– personalism of William Stern and the integrative value of personality,
– research of early ethology on the complexity of behavioral organization.

For an essayistic presentation, I would like to anchor my points around specific heroes, such as John Stuart Mill, William Stern and Karl Bühler. Yet these persons should be understood as representatives of an entire stream.

During the long prehistory of positive psychology, many central issues emerged at various times. We can consider the tradition of positive psychology as one whose roots are based in an opposition to a passive, hedonistic and at the same time helpless image of man. In this broad sense, positive psychology has a distinctly decent past. This opposition is shown in **Table 3.1.**

Table 3.1. Opposition of points emphasized by trends towards positive psychology and by those of traditional psychology

Positive psychology trends	Traditional trends
Central role of non-utilitarian motivations	All motivations are of a homeostatic nature
Knowledge has a positive feedback in itself	Knowledge's only value comes from its use value
Self-initiated activities	Reactive organization
Curiosity and boredom are key aspects in human life	Basic human motivations are fear and anxiety, and search for direct reward

John Stuart Mill under the guidance of two constellations:
A follower of Bentham and of Coleridge

John Stuart Mill has lived under the impact of two stars, Bentham and Coleridge. As he himself described it, both were looking for solid foundations. But one was looking for this in the reduction of every complicated human feeling to its elementary moments, while the other in the striving of humans for more, for spiritual meaning. The first was utterly utilitarian and honest in trying to reduce all aspects to pleasure and pain, while the other was utterly romantic to the bone. (About these influences see his autobiography, and his collection of essays, Mill, 1962.)

John Stuart Mill started off on his road to investigate human nature armed with the notions of empiricism and comprehensive utilitarianism. The taken-for-granted model of the mind for him was utilitarianism. The concept of utilitarianism was introduced by Jeremy Bentham (1789). He presumed that people are rational and selfish "*economic men*" (p. 111). His aim was to describe human nature with as few parameters as possible; in our head there are ideas that combine with each other obeying a small number of associative laws. The father of Mill, James Mill (1829) even insisted that there was but a single law of association, which is *contiguity*. According to utilitarian thinking, human motivational forces are kept in motion by a small number of tendencies; these are the pursuit of happiness and the avoidance of pain. Values are created by the association of ideas and representations with this small number of basic tendencies. Thus, social life and our entire complicated social structure is a result of the contingent connection of these tendencies, in the same way as money gets its value: through satisfying our basic needs. Accordingly, the entire social structure is going to be conceived of as an associative construct, as a secondary alignment of originally separated individual entities.

This approach had a certain moral undertone as well. The utilitarian human being stripped off from all considerations, based on an outdated moral authority would merely follow the calls of interest. Therefore, the aim of moral analysis would not be to condemn these tendencies in humans. Rather, our aim would be to build a society without illusions that would comply to these principles. Unnecessary human suffering is a result of not observing the general laws of human nature. Thus, a social structure based merely on interest seems to be immoral for old style moralists, but indeed, it is the one that reduces overall suffering, therefore, that is moral for the new school.

> *Nature has placed mankind under the governance of two sovereign masters, pain and pleasure. It is for them alone to point out what we ought to do, as well as to determine what we shall do. ... The principle of utility recognizes this subjection, and assumes it for the foundations of that system, the object of which is to rear the fabric of felicity by the hands of reason and of law. Systems which attempt to question it, deal in sounds instead of sense, in caprice instead of reason, in darkness instead of light.*
> (Bentham, 1789/1948, pp. 1–2)

John Stuart Mill (1859, 1962) recognized that utilitarian thinking, with its reduction of human motivation to a few principles, seemed to be right when considering its adversaries, the contemporary systems that operated using speculative internal forces and moral feelings or other intangible entities to explain the complexities of human motivation. Yet, he also realized that human mental life does have aspects that simply do not operate in the usual distributive way.

In this conceptual transformation, the young Mill undeniably had a personal inspiration. As he described it very vividly in his autobiography (Mill, 1873), he was touched by romantic love himself, but a few newly discovered ideas also played a role in his change of mind: in particular, romantic poetry and humanistic philosophy. The ideas of Mill regarding the moving forces of the human mind can be summarized in four basic points:

(1) *Knowledge is not a distributed property.* If we gain knowledge, no knowledge is taken away from somebody else. Using modern terms, one can say that knowledge for him was not an economic property, not a part of a zero sum game.
(2) *Love should not be interpreted in a utilitarian way either.* Love is not distributed; if I love more people, I do not take away any love from other people – a slightly romantic thesis.
(3) *Self-perfection must be considered a life goal in itself.* Man does not only strive to find pleasure and avoid pain, but also tries to improve him- or herself.
(4) *Human life has a non-utilitarian, rather romantic aspect, too.*

19th-century German philosophy, particularly the work of Wilhelm von Humboldt (1827), played a crucial role in Mill's questioning the principle of utilitarianism. Humboldt's vision of human personality, which has become the cornerstone of knowledge-based but liberal educational systems, presented the cultivation of personality and a refining of individuality as a self-sufficient goal in itself. Under the impact of these "German Romantic ideas", the cultivation of individuality, personality, and its enrichment became self-sufficient goals for Mill. The cult of individuality, of the individual who would be different from anyone else was to become a balance against the mechanical features of his own intellectual system.

According to Mill, the cultivation of individuality is a balancing factor against the simplifying forces of associative mechanics. From a historical point of view, another important conclusion of Mill (1859) is the cultivation of freedom: considering freedom as the most important value helps us to clear the barriers that restrict the cultivation of personality as an end in itself.

All of this was clearly related to the internal events of the life of Mill. John Stuart Mill was a precocious genius. His father forced him into serious intellectual work before he was even ten. His autobiography is an excellent psychological resource. He himself explained in it, among other things, the way he gave up the exclusive use of utilitarianism. His personal crisis is the crisis of a bookish youngster who theoretically sees through the futility and emptiness of all of our efforts. Two questions were raised in his mind during this rather early "middle-life crisis". One of them is related to the necessity and compulsion for analysis. Following associationist and utilitarian

principles, if one should retrace everything back to its origins and sources, the authenticity of the feeling seems to be lost. Regarding himself as a domain of mental and motivational mechanics, his feeling of individuality is lost. His second personal problem had to do with the aims of life: does the entire struggle for an overwhelmingly and strictly rational world have a meaning, does it give a meaning to life to fight for the victory of utilitarianism? His personal dead end had a general meaning: it showed the personal impossibility of a consequentially scientific, mechanistic life style as a personal program for life. Sigmund Freud, who as a young man translated Mill's autobiography, lamented on his artificial life to a considerable extent.

As for the motivational aspect, Mill in his later works emphasized that there are certain aspects of life where shortage economy is not valid. Shortage economy implies an image in which actors have a zero sum game structure: if A has more of commodity X, then B necessarily has less of X. According to Mill, *knowledge and love* are exceptions to this economic equilibration. They can increase in each individual without taking them it from others. If I know more, it does not take away anything from your knowledge. Knowledge for Mill does not follow the message of equating the function of knowledge with instrumental uses, as the famous slogan of Bacon' knowledge is power" implied it. The cultivation of these aspects of life, together with a cultivation of the idea of a patterned personality and individuality, taken over from Romanticism and from the German Enlightenment, gives him a chance to overcome the equilibrating and static model, as well as the egoism of an all-round utilitarianism. It is true, from a strictly naive consideration, that these two factors are the ones which can only be achieved and accomplished by the given individual: I can do tasks instead of you, but I cannot *know* instead of you. I can help you to find someone to love, but I cannot love *for* you. Thus, the non-zero sum elements are at the same time the ones which are irreplaceable.

Indeed, present-day *decision theories* would label Mill's concept as an attempt to emphasize the non-zero sum aspects of life. The circumstances of *shortage economy* normally put actors in zero sum games. If A gets more, then B necessarily has to get less. Yet knowledge and love do not seem to operate this way, they do not belong to the realm of shortage economy. This is far from being trivial: *knowledge is power* is a concept that from Francis Bacon to Lenin contradicts the idea of non-distributed knowledge. They were right in a way, considering the fact that in real societal contexts, knowledge can become an economic power. For Mill, however, this aspect was not the only one to be considered. He was rather concerned about the aspect that knowledge – regardless of its use – makes one's personality richer.

According to Mill, self-motivated – or in other words more playful – factors in life, such as love and knowledge, lead to the cultivation of personality. The mind, because of its curiosity, can be regarded as a self-motivated/self-explaining knowledge generating system. And personality as well seems to develop in a *l'art pour l'art* fashion. In the later conceptual system of Darwinism, this shall be interpreted by claiming that a greater behavioral or reaction potential will imply greater evolutionary potentials.

From the point of view of the philosophy of history, one might treat these as poor or weak proposals. It is worth highlighting, however, that they are not in discord with some present-day ideas regarding the importance of non-regulative elements in the organization of human societies.

34

In psychology proper, the ideas of Mill prepared the field for the so-called *self-actualization* theories of motivation and personality, and continued in positive psychology trends that criticize the underlying shortage economy principles of the regulative views on motivation. Mill also has some affinity to the theories and educational practices related to cognitive motivation, to the idea that knowledge for its own sake is not something that should be looked down.

Mill's 19th-century thoughts were transformed and became part of an elaborated tradition, thanks to the translating mechanisms of earlier 20th-century professional psychology. One of these is the cult of "personality" and the other one is the emphasis on motivation systems that are based on self-actualization. I would like to introduce two lesser known representatives of these streams, who advocated these ideas decades before the advent of modern positive psychology movement. One of these trends is the transformation of the cultivation of personality into actual research on personality and the other is a unique interpretation of ethology in the works of Karl Bühler.

William Stern: Integration and internal meaning in personality

William Stern, as we have all the right to say, is much more in the history of modern psychology than just the "inventor of IQ" (see about this Lamiell, 2002). From the beginning of 20th century, he tried to develop an ambitious program emphasizing that personality should be one of the most important integrating factors of psychology, and a related program about the constructive nature of human development. In his first synthesis calling for differential psychology (Stern, 1911), he already declared that essentially there are two possible basic approaches to personality psychology. One of them presupposes and analyses traits, discusses those "formal regularities that are entailed in the very fact of mental variation" (Stern, 1911, p. 8). A basic Darwinian idea in his approach to personality is the necessary variety of humankind underlying these personality traits. This would be the essential core of differential psychology. A second task for this would be to analyze, after examining all the human varieties, correlations among the traits. In both of these approaches, however, the emphasis is on the features rather than on the individual as such. Another less nomothetic approach, closer to the followers of Dilthey (1894), relies on a more ideographic description in dealing with personality. According to Stern (1911), in order to fully understand human personality, we also have to approach it starting from the unique and original, i.e., from the individual. The two main methods for this latter purpose are psychography – a description of individual personal profiles, where biography is compared to individual profiles (that reminds us of contemporary psychohistorical approaches) – and comparative studies, where different particular individuals are compared in their totality.

The desire for another, idiographic pole already appeared in Sterns' early work. Essentially, that was a desire to attribute an independent meaningful globality to personality and to emphasize this, like in his pioneering case study of Helen Keller (Stern, 1905). The individuum-centered approach was present not only in the ambitious theoretical projects of Stern (1938) but also in his practical dealings: for him, intelligence testing also was an issue of idiosyncratic profiles. He believed that no two persons with

the same IQ can actually have the same underlying profile behind the same performance (see a modern analysis of this attitude in Smith, 1997).

In the domain of developmental psychology, Stern together with his wife (Stern and Stern, 1907), was a pioneer researcher of child language. He claimed that when acquiring language, children are recreating it, in line with the German romantic ideas about mental activity. However, they not only emphasized this very modern idea, rediscovered by followers of Chomsky (1968), like Blumenthal (1970), who inserted the approach of the Sterns into a nativistic framework of developmental psycholinguistics. They also formulated ways to identify symptoms of this activity in the error patterns of children. They differentiated between *immanent errors* like *goed* instead of *went* that do not change rules, only apply them to wrong domains, and *transgradient* errors like *hand-socks* for *gloves*. Both imply, from the perspective of present-day psycholinguistics (see Pinker, 1997), that children are struggling with rules, they are not acquiring merely associative habits. For the early German developmentalists, this was a self-evident issue. We have to remember how long it took for other developmental research trends to rediscover relationships between rules and creativity in the individual re-creation of language.

Stern also developed a very characteristic theory concerning the development of individuality, the often-quoted *convergence theory* (e.g. Stern and Stern, 1907; Stern, 1936). The central point of this theory is not merely that our personality is determined by genetic and environmental factors alike, but that these factors permanently and mutually presuppose each other, and somehow have a converging causal impact on behavioral development. For Stern, development is much more than just the realization of a genetic plan. It has epigenetic laws, we would say today – as stated by Oyama (2000) and Karmiloff-Smith (1998), though not referring to Stern. Environment, and as we see it today, the very epigenetic process have an influence on the realization of these internal programs. In accordance with this, according to Stern, the whole personality is influenced by both genetic and environmental factors, and these are not merely additive, rather, they operate on the same internal structures. It is not accidental that forty years later, in the sixties, David Krech (Krech, Rosenzweig and Bennett, 1960) rediscovers Stern while studying environmental and genetic determinants of animal learning performance. Selective breeding and early experience in rodents seem to have the same target: the same cortical chemical and metabolic factors operate under genetic and experiential influence, and they are not complementary but rather have an effect on the same underlying mechanism: on the relations of subcortical/cortical reactability and increased metabolism.

After a few purely philosophical excursions that are referred to as "personalism" (see Stern, 1936), in his later works, Stern arrives at the conclusion that the entire human psychology should be approached from the aspect of personality (Stern, 1938). "Personalism" as an integrative discipline is the study of the entire person, and personality psychology or even psychology is simply a part of this broader enterprise. Mind goes beyond the differentiation into the mental and the physical realms, and it represents the original unity of the individual. This unified personality is the joint interface we would say today that makes any investigation of mental phenomena sensible ad explainable. Personality, which for John Stuart Mill was a factor to be cultivated on

moral grounds, in the approach proposed by Stern became an integrating factor of an *all-inclusive human science*. This approach had its followers later on. Most notably, Gordon Allport (1968) emphasized specifically the influence of Stern in shaping his person-centered view of psychology. And as the reviews of Lamiell (2003) and the theoretical papers in Lamiell and Deutsch (2002) indicate, the influence of these person- and activity-centered (constructivist) ideas is starting to be felt again.

Even the very "personalistic" Stern never became an oversimplifying critic of psychology as a possible science. For him, psychology is the study "of the person having experience or being capable of having experience" (Stern, 1938, p. vii). Though in accordance with his German idealism, he is very value- and culture-oriented, the Dilthey–Spranger (1926) type of division into two psychologies, one causal, the other "understanding", does not appeal to him. He remained a monist in a strange sense. If we look at the "substrate" of the soul, he claims, one has to conclude that

> *[t]he substratum of mind must be something* that has existence going beyond or prior to the differentiation into the mental and the physical, *thereby certifying personalistics: it is the study of the whole human person. Psychology is a part of this studying the original unity of the individual*
> (Stern, 1938, p. 69).

Karl Bühler and early ethology

A third intellectual ancestor of present-day positive psychology comes from the first steps in the field that has later become ethology. Early ethologists, such as Heinroth, Uexkühl and Konrad Lorenz, clearly described three factors in the unraveling of animal behavior (see Lorenz, 1965, for a review). The first is the postulation of species-specific behavioral patterns. The development of these patterns is determined and characteristic to the species, in evolutionary terms, but it also requires environment-dependent critical experiences. In addition, exactly due to the existence of innate/internal programs, the animal can never be described as a passive, merely reacting creature: its entire behavioral range is an expression of internal behavior program patterns.

In the twenties and thirties of the previous century, Karl Bühler (Bühler, 1927, 1934, 1936) tried to unify psychology, relying on these early ethological principles. The key element in this unification was the idea that all behavior – from the simplest animal behavior to human culture-creating behaviors – is assumed to be meaningful. Contrary to the postulation of a split or schism between natural science and human science psychology (Spranger, 1926), proposed by the followers of Dilthey (1894), rationality is a characteristic of all behavior. At the same time, however, according to Bühler, behavior is always a self-initiated activity. Not even animals – and certainly not humans – can be regarded to be merely reactive creatures, as mere automata. They always attempt to construct a model of their environment. In this modeling activity, the role of Darwinian selection and its broader interpretation are pivotal for Bühler (1936). He was the first to formulate two principles that control today's philosophy of the mind (Dennett, 1995) and the philosophy of neural processes (Changeux, 1983; Edelman,

1987): all behavioral organization is characterized by an early stage where a rich and redundant inventory of behavior is formed with an excessive number of elements and associations, and a later, selective stage, where certain patterns are chosen on the basis of environmental feedback. This two-phase formulation has three forms, according to Bühler: the first is represented by instincts, the second by habits, and the third by rationality. The main point about the relationship between the three levels – as expressed very definitely by Karl Popper, a disciple of Bühler (Popper, 1972) – is that instead of risking survival as in Darwinian evolution, in intellectual selection we are only risking our ideas. These three levels also differ in their flexibility, but the organizing principle is the same in all of them. First, there is an attempt to develop a variety of behaviors, which is later reduced based on the feedback from the environment. With more flexibility, with more internal vicariation, as Campbell (1974) put it, the same process becomes more flexible, thereby producing more fun.

I concentrated on three prominent figures here. All of them are predecessors of positive psychology in the sense that they emphasize the delight of knowledge. For them, knowledge typically appears as its own reward. On the other hand, because of their integrative and sign-based knowledge interpretation, they are reflected in later 20th-century theories that emphasize the significance of cognitive motivation. As Bühler (1922) has put it, knowledge is characterised by *Funktionslust*, functional pleasure. Their concept of development is peculiar as well: from Stern and Bühler on, development is considered to be the formation and formulation of internal knowledge and knowledge handling procedures. For all these authors, the value of knowledge, the cultivation of personality, and a stress on initiative and independence is crucial. For them, development is a formation of knowledge guided by intrinsic principles. As for the motivational component, for all these authors, it was rather clear that there is a certain paradox: even useless activities are useful for people, since they assure the avoidance of boredom and mental survival.

THE FORMATION OF 20TH-CENTURY
COGNITIVE STUDIES

4. DARWINIANS OF THE SOUL*

"If we're all Darwinians what's the fuss about?" – this famous title of Symons (1987), originally proposed about the application of evolutionary arguments to the study of behavior does carry a relevant message to the recent evolutionary applications of psychology as well. The careful reader can notice how many different approaches to evolutionary psychology exist today. This is true on the international scene, but it is also present in Hungary as well, as the Hungarian volumes edited by Pléh, Csányi and Bereczkei (2001) and by Pléh (2002) show in their variety of approaches. There certainly are many possibilities today to be a Darwinian. Nemes and Molnár as well as Bereczkei (2000) indicate that there are basically two interpretations of the term *evolutionary psychology* that became a celebrated fashion of the previous decades. One is the view of a peculiar school that is headed by Cosmides and Tooby, introduced first in their reader (Barkow, Cosmides, and Tooby, 1992), but outlined in many other publications, including ones where a connection is proposed between modular brain organization and mosaic-like selective adaptations for different cognitive domains and functions (Tooby and Cosmides, 2000; Duchaine, Cosmides, and Tooby, 2001). The challenging aspect of this particular vision, let it be called the standard view Evolutionary Psychology, or EP, is that it ties a peculiar interpretation of Darwin to computational, mechanical, or algorithmic concepts. In a *pars pro toto* way, it advocates itself as the only possible Darwinian psychology. Even in its non-computational interpretations, it certainly is an ultradarwinian approach, in the sense that it intends to explain every aspect of the architecture of the mind by selective and specific adaptation processes as presented by the leading advocate of this reproductive selection theory for cognition David Buss (1994, 1999).

The other approach is softer, and at the same time broader. Let us call this more comprehensive approach Evolutionary Attitude, EA: this approach is trying to be a protagonist of Darwinian thinking in any field of psychology, as represented most clearly by the textbook of Gaulin and McBurney (2001), who try to present "general psychology" as seen from the perspective of evolution. This view can be interpreted to be more generous both from a historical and from a contemporary point of view. It establishes a continuity between the numerous Darwinian ideas that arose in psychology, such as the functionalism of late 19th-century, comparative psychology with its

tradition over a hundred years, the evolutionary epistemology proposed by the followers of Karl Popper (Campbell, 1974) on the one hand, and our current evolutionary concepts on the other hand. The difference between the present situation and the situation many decades ago is not to be found in our questions (our curiosity about whether animals can think existed 120 years ago as well as today), but in the greater data sets and the more sophisticated methods available today.

For a redefinition of psychological issues in an evolutionary framework, a great help was received from researches of experimental cognitive psychology that lead to a better understanding of the inner world of the human mind. We know better today what it is exactly that we have to explain. Another factor was the emancipation of human ethology (for a Hungarian overview see Csányi, 1999), along with the discussions concerning sociobiology (see for example the volume edited by Crawford, Smith, and Krebs, 1987). The differences and continuities between sociobiology and evolutionary psychology are not all as trivial as one sometimes feels. EP is a new vision compared to sociobiology since it deals with the inner world (treating the psychological side as belonging to the proximal stage of explanation in the sense of Mayr, 1982), and takes into serious consideration the results and methods of experimental psychology, which is a big change compared to the attitude of sociobiology, which tended to treat the mental realm as an epiphenomenon. The change is not only flirting the permissible vanity of psychologists but it broadens the levels to be taken in interpreting behavior.

As far as the past of evolutionary psychology and the evolutionary attitude is concerned, Hungarian psychology boasts with a long and great theoretical and experimental background. Paul Harkai Schiller, mostly known in the Western literature as Paul von Schiller, in the nineteen thirties and forties was looking for analogies between the teleology in the behavior of animals and human purposeful behavior. He tried to elaborate an intentionality-based, ethologically-inspired theory of complex animal and human behavior, proposing a function-based unified psychology, where biology and sign-related behavior would go together (Schiller, 1947b). He also tried to elaborate the application of this holistic attitude to the animal mind in experiments on detour behavior (Schiller, 1948, 1949a, 1950), and in analyzing figural preferences and drawings by apes (Schiller, 1951, 1952). Lajos Kardos (1980, 1988) established another tradition. He proposed a general theory of the genesis of the mind, maintaining that mental organization gradually evolves as a consequence of predictive information available in stimulus arrays. In his experimental research continued over three decades, he analysed the relationships between spatial orientation, lifestyle and memory system in rodents claiming for memory maps of a more concrete visual nature than the cognitive maps proposed by Tolman (1948). The continuity of this comparative approach is shown in the work of Magda L. Marton (1970, 2000), firmly based on her experiments on the role of the body schema of primates in the evolution of the self.

Some of the authors in the volume surveying present-day Hungarian evolutionary psychology – Nemes and Molnár, Bereczkei (2000) – would rather replace the parochialism of mainstream EP with a comparative psychological perspective, and would try to continue this tradition. We should be aware of the fact, however, that concentrating on humans – what is implied by many to be a limitation of EP – is not a defect of evolutionary psychology. It is mainly dealing with humans, not because of

narrow-mindedness, but rather because it seeks answers to questions that are inherently connected to the human condition (why we are jealous, how we see colours, why there are so many languages, what is the origin, function, and role of personality differences, etc.). Ilona Kovács (Kovács, 2000; Kovács, Papathomas, Yang, and Fehér, 1996) follows this line of investigation when she looks for structural homologies between perception and animal memory. According to her, the mammal nervous system tries to avoid both the impossibility to localize two objects in the same place and that of contradictory internal experiences. Here we see a continuity between the traditional comparative questions and current investigations in evolutionary psychology and cognitive psychology of visual experience.

Many central questions of the leading psychological theories are shown in a different, evolutionary light in the framework of the new evolutionary psychologies. **Table 4.1.** shows some features of the two frameworks mentioned above.

Table 4.1. Two approaches to the application of evolutionary ideas to psychology

Issues	Evolutionary psychology (EP)	Evolutionary attitude (EA)
Adaptationism	Every mental feature is an adaptation	Both adaptations and exaptations
Architecture of the mind	Entirely modular	Modules and general cognition
Determinant features	Early environment, Pleistocene mind	Epigenetic programs, interactions
Concentration	Sexual attraction, motivation	All of human psychology
Computation	Adaptations as programs	Not relevant

The construction of mind. EP, as shown quite critically by Nemes and Molnár or Kampis, is based on the "Swiss army knife" model of mental structure. This is a radically modular view which postulates that the human mind is a series of independently evolved and autonomously functioning adaptations. This view has to face many criticisms, both on conceptual and on experimental grounds. Even the creator of this modern-age modularity concept, Fodor (1983, 2000) emphasizes that we have to keep the duality of specialized and general problem solving modules in order to have a rational animal.

However, the radical modular view of EP is far too easy a prey. One should not forget that even though it has many conceptual weaknesses as a concept of mental development (for a detailed discussion see Karmiloff-Smith, 1992), at the same time this radically innatist modular concept is incredibly fertile from the point of view of the sociology of investigations. This analytic, as they say, domain-specific view considers all our cognitive devices to be inborn. It starts from some unquestionable facts, like the apparent wisdom of infants to uncover language structure. However, by generalizing this attitude, it claims that in all areas we have very strictly constrained specific knowledge types that are selected by evolution. This attitude certainly enriched the database

of human infant development. Even the critics of domain-specificity and nativism like Elman, Bates, Johnson, Karmiloff-Smith, Parisi, and Plunkett (1996) start from a reanalysis of the facts that were obtained by people in the nativist camp. (For a survey of their findings and approach, see Hirschfeld and Gelman, 1994). The experimental critics, like Elman et al. (1996) are able to step on stage advocating plasticity and transfer between systems, only because somebody had already stated and established the radical and simple-minded modular view. Thus, the radical conception so difficult to retain proved to be an excellent intellectual compass to fertile lands of investigation.

In fact, the issue of mental architecture and modular organization comes up along lines similar to issues of epigenesis regarding the prehistory of the mind as well.

Ideas on the historical genesis of the human mind

In present-day evolutionary speculations strong, proposals are made about the cognitive changes implied in anthropogenesis. In these theories, it is assumed that some relatively stable processing modes do exist that are invariable across cultures, and only some parts of the entire architecture are under the influence of cultural domains. The evolutionary process would explain the aspects of architecture that were formed in a slow, piecemeal Darwinian manner as contrasted with culturalist ideas. These are strong biological architectures, and culture has an impact only on the higher, output levels of these computations and cannot rewrite everything.

Table 4.2. Characterization of two types of mental architecture

Primitive architecture	Culture, modern architecture
Evolved	Unbound
Fixed	Flexible
Fast (ms, s)	Slow (minutes, hours, years)
Formed over millions of years	Centuries, decades

The formation of these universal mental architectures though it is a gradual evolutionary process could be summarized according to critical stages of hominid evolution. One of the most comprehensive modern proposals encompassing biologically given architectures, and at the same time emphasizing the formative influence of culture has been made by Merlin Donald (1991, 2001). The unique feature of his approach is that Donald assumes *correspondences between communication and representation, external and internal worlds.* Neuropsychological changes in brain organization during hominid evolution, changes in internal representation, and changes in the field of communication and economy in memory go hand in hand in creating what he calls the modern human mind. **Table 4.3.** gives a summary of his views.

Table 4.3. The conception of Donald on changes in systems of representations and cultures

Culture	Species, age	Memory organization	Transmission
Episodic	Apes, 5 million yrs	Episodic events	None
Mimetic	Homo erectus, 1.5 m yrs	Body representation social enactment	Enactment, imitation
Mythical	Homo sapiens sapiens	Linguistic semantics	Myths, narrative knowledge and transmission
Modern	Modern humans 10,000 yrs	External storage Hierarchical store	Fixed knowledge External authority

Donald outlines a brave conception on changes in representational systems during anthropogenesis. In hominid evolution, there are special adaptations he calls "cultures". The essence of the three special systems of representation is a different organization and transmission of knowledge. The stage that preceded these changes is the episodic, stimulus and experience bound organization which is basically common between humans and the apes. The primate mind is characterized by episodic culture. In episodic culture, knowledge is always personal and contextualized. The real human change appeared with the advent of a social semantics with shared knowledge, which allowed our ancestors to overcome limitations of the solipsistic mind. Mimetic culture was the first social system of knowledge, much preceding natural language, about 1.5 million years ago. It established a world of intentional representations through the body, entailing an open generative system, with communicative intentions of a referential nature, using internally reproduced representations. Its domain is visual and motoric, involving besides hand gestures the use of body posture and facial expressions. Its neurological precondition is a relatively precise representation of the body and the outputs of the episodic system.

Regarding cognitive architecture, mimetic culture implies a more precise control over our own body, executive functions being able to "turn inward" as well. This means that the perceptual world and mind of the primates was replaced by an action-oriented world in early hominids making action the object of tradition.

From then on, concepts become shared, distributed. Social plays, organized teachings, systems of transmission are born, as well as coordination through communication and joint representations, as in social hunting.

Mimetic culture at the same time was very conservative and slowly changing. Its reason was that mimetic culture always required an episodic anchoring, its contents being provided by contextually bound episodic knowledge.

A language based on sound manipulation also implies a culture characterized by faster social changes. Donald refers to this as *mythical culture,* due to the prevalence of narrative language use in the early stages. The dominant new organization of knowledge is through action- and protagonist-oriented narratives. Integrative myths of a group are an outgrowth of narrative patterns. Narratives are essential for change as well. "On a cultural level, language is not about inventing words. Languages are

invented on the level of narrative, by collectivities of conscious intellects" (Donald, 2001, p. 292).

The third turn was established by the formation of theoretical culture that involves the discovery of external storage mechanisms. Writing embodied this external storage space. In episodic, mimetic and mythical cultures, knowledge was basically represented in the brain of an individual, though regarding their origins, in language-based (mythical) culture, they certainly were of a distributed social nature. With the advent of writing, they become social systems independent of us, thus establishing a division of labor between our own working memory system and the external supporting memories. External memory can be realized in many physical forms, it is unbound, stable and in principle always accessible. This *in principle* is of course questioned by the long stories of sacred knowledge, censorship and the like, and in a way, the modern network-based knowledge carriers are in fact proposing that network-based knowledge provides for real constant accessibility. But compared to our individual brains, books are certainly a more accessible system. Writing creates a system that, with the new organization of knowledge, leads to new epistemologies and visions of knowledge in general (Nyíri, 1992). From then on we can talk about a symbolic theoretical culture that will become the main governing principle of formal education with the image of a noetic system that has an independent existence. According to Donald, due to writing, our mental apparatus is relieved from overload: in any given occasion, sometimes it only has to contain some arrows pointing to relevant external memories, and sometimes the written "frame" as an external aid has allusions to internally stored locations.

Representational changes are the moments that allow us to better understand the relations between brain reorganization and hominid evolution. According to this vision, "We are a culturally bound species and live in a symbiosis with our collective creation. We seek culture, as birds seek the air. In return, culture shapes our minds, as a sculptor shapes clay" (Donald, 2001, p. 300). This creates a peculiar bridge between biology and culture.

The four cultures, according to Donald, do not replace each other but create inclusive relations. It is this inclusiveness that leads to a new kind of consciousness, self-organization and creativity in communicative and representational systems. Creativity, as it was emphasized by many, is the ability to overhear between otherwise separated systems. In the framework put forward by Donald, this appears as the option provided by mentally coexisting cultures.

There are several attempts regarding anthropogenesis as well that try to overcome the fixed, modular nature of the mind by emphasizing flexibility and representational crosstalk in a similar way that is proposed by Karmiloff-Smith (1992) for development. Steven Mithen (1996) claims that the human mind is characterized by a crosstalk between very general types of originally isolated, modular intelligences, such as social, technical, naturalistic, and communicative intelligence. The mythologies show a crosstalk between human and natural intelligence, by treating animals as humans. Group stereotypes would act the reverse way, by treating humans as animals. In short, most of what is studied about the creativity of human culture is treated by him as the special human feature that the development of special modules in hominid evolution was followed in the last stages by a cross-modular representational system.

Elementary sociality as an evolutionary issue

The evolution of social interactions are of a central importance in present-day EP when talking about the peculiarities of the architecture of human mind. In fact, the different proposals regarding some kind of elementary biological sociality are proposed as key bridges between biological and cultural psychology (Tomasello, 1999), or between biological and social determinism. In this regard, present-day EP and EA are taking up the traditional biology–culture continuity issue characterizing the debates of late 19th century.

According to Donald, the peculiarly human development leads to the birth of *hybrid minds* who live in *cognitive communities.*

> *The evolutionary origins of language are tied to the early emergence of knowledge networks, feeling networks, and memory networks, all of which form the cognitive heart of culture. Language was undoubtedly produced by Darwinian selection, but evolved indirectly, under conditions that favored those hominids who could make their shared cognitive networks more and more precise. ... [the] emergence of language could not have initially been and end in itself ... The first priority was not to speak, use words or develop grammars. It was to bind as a group, to learn to share attention and set up the social pattern that would sustain such sharing and bonding in the species. ... The great divide in human evolution was not language, but the formation of cognitive communities in the first place. Symbolic cognition could not spontaneously self-generate until those communities were a reality. This reverses the standard order of succession, placing cultural evolution first, and language second.*
> (Donald, 2001, p. 253)

This sets the framework for the development of symbolic communities. However, for evolutionary psychologists, there is a need to explain the emergence of a socially tuned individual mind. The general mood was set in biological terms by Nicholas Humphrey (1976), claiming that the minds of all primates and consequently of humans evolved primarily under the requirements of social pressure, and that the original function of intellect was to give orientation in social life, either in a positive way, via empathy and similar functions, or in a negative way, by means of manipulation, by development of what is called today a Machivellian intelligence (Byrne and Whiten, 1988). Referring to apes, some researchers go as far as talking about them being "natural psychologists" (Humphrey, 1980), and others claim that language and learning, the foundations of human culture, are based on the need to decode the intentions and thoughts of others (Tomasello, 1999). Current evolutionary psychology is a continuation of this ethological view, and so is cognitive psychology. Nemes and Molnár claim that sociality is the field where evolutionary and cognitive views could really meet.

An interesting question for believers of EP is to explain in a modular frame when a human infant shows signs of having a "theory of mind", the peculiar knowledge of "the other mind" emphasized by philosophers of cognition. Baron-Cohen, Tager-Flusberg, and Cohen (2000) in their study show the broad implications of this issue, from apes'

intelligence through child development and autism to the development of prefrontal functions in humans. One of the key debates here is up to what point can the theory of mind be considered as a self-contained system that has its own autonomous development? Evolutionary science headquarters are quite divided concerning this question. The scale ranges from "theories" that attribute to the human child a naive theory that is like scientific theories to views and concepts about emulation and imitation, and starting off from first person knowledge on the other end.

The publications of Csibra and Gergely (see e.g., Gergely and Csibra, 1997; Gergely, Nádasdy, Csibra and Bíró, 1995; Csibra and Gergely, 1998; Csibra, Gergely, Biró, Koós, and Brockbank, 1999) show clearly the fertility of modularity theory as a starting point. Their much cited experiments, apart from being in line with the investigations about "knowledgeable infants", also show how an apparently dry philosophical theory can become a generous inspirator for cognitive research. Formerly, they dedicated themselves to show that an infant is capable of taking up or assuming an intentional stance that was proposed by Dennett (1987). According to their recent work, however, this is preceded by a purely teleological knowledge in infants as young as 6 months of age. Csibra and Gergely also show the further steps that lead children towards a fuller theory of mind that projects thoughts and intentions into the others. The studies of Győri (2006), another investigator who sees this as a key issue, take us to the field of applied evolutionary psychology. Currently, the most widely investigated generic developmental disorder of the mind, autism provides us with an opportunity to put our views about the theory of mind to a test (see again Baron-Cohen, Tager-Flusberg, and Cohen, 2000). Can autists be simply characterized by mind-blindedness? This would support the idea of a naive psychological mind-reader module as an independent adaptation in the eyes of a modular theorist. Or is this peculiar disorder a malfunction of a general executive function, which therefore fails to connect ideas to each other? The study of Győri (2006) is a good example that our theories about the entire mental architecture can be used as a leading compass in the labyrinth of applied questions of research on developmental disorders.

Evolutionary ideas about human sociality show up in other clinical fields as well. The investigations of Péley, analyzing attachment processes in troubled adolescents show that if we take an evolutionary point of view, it is possible to cram into our vision both the "hard" biological and the "soft" biographical narrative facts when it comes to explaining individual differences and pathologies.

Body–mind relationship and evolutionism

Contemporary psychology, if it is at all valid to use such a generalizing expression nowadays, is an heir to the functionalism originally created by Aristotle, and later revised by Ryle (1949) and among other evolutionists, by the Hungarian Harkai Schiller (1947). In this broad functionalist view, mind is the form of matter, that is to say, mental processes do not articulate an independent level above material processes in the brain. The later cognitive interpretation of this notion proposed that mental processes are always realized by a material system, yet they are not identical to it. This

program of research, in its cognitive version of functionalism, was on the peak of its success at the end of the nineteen seventies. (See the reader edited by Ned Block, 1980 to this effect.) Not only did it revive an ancient philosophical heritage, it also gave faith to the autonomous investigation of the inner world. As Nemes and Molnár, Bereczkei and Kampis (2001) clearly show, this program has by now dried out. The development of neuroscience and evolutionary thinking once again gives a leading role to investigating the relationships between mental structure, material implementation and the evolutionary origin of the system. Keeping the virtues of this by now sterile functionalism, our task today is to find a place for the mind in the system of proximal and distal explanations of biology, as systematized by Mayr (1982). Meanwhile, in this frame, classical issues of psychology, such as the status of causal models and determinism are being rephrased in a new way. This is a critical point, where evolutionary psychology and sociobiology diverge. Sociobiology, like eliminative materialism (Churchland, 1981, 1986), tended to treat them as concepts like the ones cultivated in astrology, to be eliminated as neuroscience and evolutionary theory progress. EP, however, considers psychological proximal causes as real and existing entities again. The redefinition emphasized by EP and EA has two new aspects. On the one hand as it is emphasized by Nemes and Molnár and Péley, the epigenetic tuning, i.e., the role of experience in stabilizing these adaptive characteristics in the behaving individual, becomes important, as opposed to simple genetic determinism. On the other hand, this new view seeks a harmony between neurobiological and evolutionary explanations. The original proposition of Kampis (2001), to consider the body as a model for the cognitive system, and the union of corporal phenomenology and evolutionary thinking is a good example of the renewal of concepts that the application of the evolutionary frame brings about. Szathmáry (2001), concerning the beginnings of language, shows that the human cortical system elaborated a new, more dynamic (amoeba-like) localization principle, as opposed to static modular conceptions about cortical architecture. At the same time, he most markedly stresses the importance of understanding the co-evolutionary processes between social structures and the evolution of the brain. In general, language as a human neoformation is the clearest case where the alliance between the proximal, neuroscience-based, and distal, evolutionary considerations becomes the most articulated (see e.g., Jackendoff, 1999).

The question of ultraadaptationalism

Evolutionary psychology revives the interest in the issue of explanatory frames for mental phenomena as is shown already by the considerations over body–mind relations. Explaining by development is restored to its former glory. This also adds more weight to considering the individual epigenesis as an important factor as well. It is also becoming a respected and interesting question again what the relationship is between evolutionary prehistory, advocated by EP, and "real history". In the resolution of this particular query, narrative theories might have a central role. There are some avantgarde efforts to create this connection. One of them is the conception of Donald (1991, 2001), already analyzed. For him, the key to continuity between prehistory and histo-

ry is the fact that the crucial moments are always corollary changes in mental representation and communication tools in the construction of human mind.

One of the central issues of the quest of this explanation is whether every single architectural feature of thought, experience or perception is a result of specific adaptations. EP advocates this view. Modular conception and selection go hand in hand: we are the way we are because we were selected to be this way. This theory is represented not only by people like Buss (1999) but by philosophers like Dennett (1995) as well. Criticism arises from many quarters, claiming that it is a single-minded view of human nature. The source of criticism is the general utilitarian principle. As Fodor (1998, p. 211) puts it: "Psychological Darwinism is a kind of conspiracy theory; that is, it explains behavior by imputing an interest … that the agent of the behavior does not acknowledge." A way out of this can be the acceptance of the possibility of evolutionary by-products (exaptations), as proposed by Gould and Lewontin (1979), and Gould and Vrba (1982). Some particularly human features leading to culture can be by-products of structural processes or exaptations of selective forces that acted on some other feature. Another option could be formulated by the assumptions regarding different levels of selection, and postulating group selection, as done among others by Csányi (1999). Eventually, all of this comes to be related to the issue of the relationship between culture and selection: how does the emergence of culture affect general (somatic) selective processes? This was already asked more than a hundred years ago. Today, we add another query to this: what was the role of selection in the evolution of apparently universal cultural patterns?

The importance and origin of being different

It is a key issue in all theories of psychology how they provide for diversity amidst their toils for looking for universal mechanisms. A model based on Darwinist selection via postulating variability promises a firm base to theories of individual differences. For psychologists, this stands out most clearly in two fields:

(1) The origin and nature of *individual differences*. Győri presents a psychological model on a peculiar population: radical differences are explained in terms of modularity in the autism literature. The massive diversity in similar conditions seems to support independent adaptations. Péley on the other hand emphasizes that a fine tuning over the individual lifespan of these adaptations is also required. We all prepare our biographical narratives (i.e., adaptations), but the content of this and the power of destiny in turn is already a question of contingent facts of our life. Thus, there are hard and soft evolutionary models of individual variability.

(2) *Variability of cultures.* From the beginnings of modern anthropology, we live with a certain anxiety in our mind: if all we have are adaptations, how do we explain cultural diversity? The solution of current social sciences (heavily criticized by EP, e.g., Pinker, 1997) is that this diversity shows precisely that there is nothing to be explained in terms of evolution within the domain of culture. Hernádi (1995) and Péley point out that today there is quite a lot of uncertainty here. On the one hand,

culture – by influencing our own domain of possible choices – creates a new space of dynamics, which according to classical ethology is a most important niche where species-specific behavior is molded and formed. On the other hand, evolution is treated by many people favoring EA not as the opposite of culture, but as the condition to create a culture. Culture is constructed, but the ability to construct it is of an evolutionary origin (Tomasello, 1999). And this seems to be the most important message of recent evolutionary psychology for the human and social sciences.

5. KARL POPPER'S BIOLOGICAL VIEWS, CONTEMPORARY COGNITIVE SCIENCE AND PSYCHOLOGY*

In this chapter, my main intention is to show that Popper has been unduly neglected in overall views about the status of psychology as a science and regarding the contentful aspects of psychology. I shall largely ignore Popper's most debated direct excursions into psychology, i.e., his controversial claims about the scientific status of psychoanalytic theories. Rather, I will attempt to show that both his attitude and his specific ideas regarding a selectionist view of the process of knowing are relevant for the most avant-garde present-day cognitive trends. Popper's philosophy should be treated as most relevant.

The enigmatic Popper

Karl Popper's legacy towards psychology and cognitive science is at least twofold, regarding both his underlying ideology and his inspiration towards factual empirical research. One of them could be called the rigid Popper, the one associated with empiricism and positivism, while the other is the flexible Popper, who is against reductionism and always calls for a more complex picture regarding the place of man in the universe than imagined by monistic positivist trends. **Table 5.1.** summarizes these two images. Both are based on real controversies Popper was engaged in.

The first attitude characterizes Popper fighting against hermeneutic trends in the social and human sciences. This is the Popper of the Open Society, and of the German methodology debate, and the critic of psychoanalytic metapsychology. In this regard, he is tough and seems to be physicalistic. However, in the other respect, his adversary is simple-minded physicalism: here, he stands for pluralism, and for the many-faceted nature of human life, even for interaction (Popper, 1996), and in particular, defends the reality of abstractions (Popper, 1972, 1996). In both cases, however, Popper remains rationalistic. This feature unites his two partisan faces or identities. While he is against the advocates of science being at the mercy of politically motivated interests, thus he is against *Wissensoziologie,* in this respect standing for "pure science", at the same time he unfolds a liberal selectionist view of society. But here again, rationalism is the unifying principle: he is campaigning, at times even rather emotionally, for a society, which due to its structural features, favors science conceived as a competition of ideas, and critical discourse.

Table 5.1. Two rivaling interpretations of Karl Popper

Rigid Popper	Flexible Popper
Individualism	Independence of the Social Realm
Scientism	World III
Mechanical vision of the world	Dynamic notions
Physicalism	Darwinian model
One principle	Multiple world
Antihistoricism	Evolution all over

Present-day psychology, and its outgrowth into cognitive science is also a rather divided domain. There are several divisions in it regarding the preferred approach (machine-based versus evolution-based functionalism), as well as regarding the architecture of the mind (rules versus connections), and its origins (heredity and learning). **Table 5.2.** presents a survey of these dilemmas. I tried to show what would be the relevance of Popper in these debates. Popper's "dialectical" message for present-day psychology and cognitive science is indicated where relevant.

The neglect of Popper in psychology

Popper – neither the "rigid Popper" nor the flexible one outlined in **Table 5.1.** – was a dominant or even a popular metatheorist in psychology, not even a would-be support for "positivist scientification" in psychology. To illustrate this neglect, it is sufficient to take a look at representative readers, both from precognitive and cognitive times. The great summarizing volume of the neopositivist-operatinalist-neobehaviorist tradition in the philosophy of science, the volume edited by Marx (1951, 1963) has but one single reference to Popper (1959), and that is only in the annotated bibliography provided by the editor, Marx. The two-volume excellent reader edited by Ned Block (1980) on the philosophy of psychology, which still functions as a point of reference for a racionalistic-mentalistic-functionalist philosophy of mind, ignores the name of Popper altogether. David Rosenthal's (1991) excellent reader in the philosophy of mind with 62 texts or excerpts contains no work by Popper. Lycan's (1990) similar collection knows about Popper, but has no explicit references to his works. Popper is treated as part of the background knowledge rather than as an explicit part of the trade in connection with the logo "let our hypotheses die rather than ourselves", or "assume a World III to avoid inductionism in science" and the like. Rakover (1990) touches upon Popper, but only as a scientist dealing with induction and falsification, without realizing the implications of Popper's evolutionary theory of knowledge.

The new MIT cognitive science encyclopedia is richer (Wilson and Keil, 1999). It has four references to Popper in a volume of 1000 pages. Popper figures in the *consciousness* and *emergentism* entry, as well as regarding induction and his methodological critic of psychoanalysis. However, his evolutionary epistemology as a general approach figures nowhere. Recently, some of the proponents for a new consciousness

Table 5.2. State of the art of the cognitive enterprise
Diagnostic dilemmas and Popper's possible message

Traditional view	Alternatives	Popper's message, if any
Unified	Modular	
Symbolic	Subsymbolic	
Logical, deductive	Intuitive, experiential	Both ways of knowing
Body independent	Body related	Ambiguous: World III and dualism issues
Based on learning	Innately organized	Both are error eliminations
Propositional	Analogous	
Individual	Social	Both
Modellable	Inexhaustible	Open epistemology
Truth-oriented	Directed by desires	World III + adaptations
Automatic, machine-like	Human, meaning-oriented	Meaning part of science
Knowledge impenetrable	Knowledge penetrable	Ambiguous: adaptive but truth-oriented

regarding the philosophy of their science brought Popper into the center again (Ketellar and Ellis, 2000). This is a new sign: it's a symptom of the emerging evolutionary metatheory of cognition, where Popper has a central place.

I intend to present Popper with an eye on psychology and cognitive science. I regard Popper as someone representing a world view towards psychology that does not recognize any "higher supernatural forces" while not being reductionistic, and has an interest towards all aspects of human existence in the light of a unified selectionist metatheory that is in harmony with the substantial theories of the biologically dedicated psychologists. He compares human order to "clouds", with their dynamic and ever emerging order, instead of machine-like "clocks" (see *Of clouds and clocks*, in Popper, 1972, pp. 206–255). This metatheory is of course an overall worldview and as such can hardly be falsified. In my reading, however, Popper is a tolerant author who would allow himself to have a worldview but as worldviews go, he would also acknowledge that this cannot be "scientific" in any 19th century sense. Worldviews can only be scientific to the extent that they look like science; they are similar to science in the structure of their argumentation.

Historical aspects:
Where does the Popperian view come from?

The basic approach to any adaptive system proposed by Popper (1972, pp. 243–245) is outlined in **Figure 5.1.** Essential to this image is the cyclic and gradual view of any change, the separation of idea or solution proposal generation, on the one hand, and selection on the other. He also postulates the necessity of multiple solution proposals in any given problem space as outlined in **Figure 5.2.**
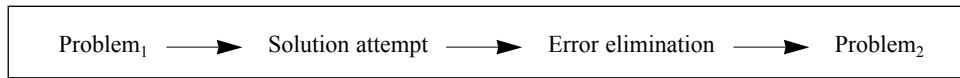
Problem$_1$ $\longrightarrow$ Solution attempt $\longrightarrow$ Error elimination $\longrightarrow$ Problem$_2$

Figure 5.1. The cyclic nature of change by error elimination

Hypotheses $\longrightarrow$ Production$_1$

Hypotheses $\longrightarrow$ Production$_2$ $\longrightarrow$ Selection $\longrightarrow$ Output
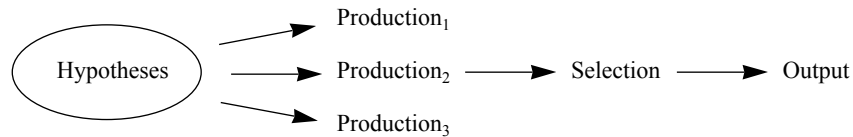
Hypotheses $\longrightarrow$ Production$_3$

Figure 5.2. The multiplicity of proposed solutions (productions) preceding selection

Where does this peculiar evolutionary epistemology come from and what are its contemporary parallels? The personal aspects are familiar from the autobiography of Popper (1976). I would only point out the two intellectual aspects that are related to the kind of academic psychology Popper has become acquainted with. The traditional bottom-up psychology of individual consciousness was challenged at the turn of the 20th century from two sides, both in many different forms (see Pléh, 2000c). The first skeptic questioning came from the analysis of animal behavior. Interpretations of the naturalistic and Darwinian heritage led to fierce debates regarding animal teleology. Jacques Loeb (1900, 1912) was arguing for an entirely mechanical conception of life with an emphasis on avoiding all considerations of teleology even in the mental realm. Karl Jennings (1906), on the other hand, represented the other extreme with his liberal use of the intentional stance in the sense of Dennett (1981, 1987). The divisive issue was whether mind, together with life should be treated in a mechanical way, in order to avoid antropomorphism, or mechanization would be more dangerous than anthropomorphism. Popper was much aware of these controversies that show up in his writings even in the 1960s.

The other inspiring intellectual debate for Popper came from considerations regarding the nature of supraindividual – if you like, Platonic – conceptual entities, the issue of, as Nyíri (1992) put it, what we see at the "starlight of nonexistent things". Should we revert to a psychologistic nominalism, following the positivistic program, or should we assign some reality to abstractions? Many trends and people do represent one of these poles in the early decades of the twentieth century, and many do feel the tensions between the two directions. Quite a few among the latter ones come from Central Europe. Valéria Dienes, (1914, 1923, about her see Pléh, 1989) the Hungarian polyhistor, for example, was at the same time a proponent of functionalist evolutionary psychology and a convinced follower of Bergson. For Dienes, at such an early time, two points of reference were Pavlov (in 1914!) with his questioning of the classical psychology of consciousness and an emphasis on bottom-up structuring, and Bergson (1896) who started from the surplus additional value of Ego-related efforts, and the thought psychology of the *Würzburger Schule* as well, with an emphasis on thought contents going beyond the ego-centered nature of the analysis of consciousness. For Dienes, as well as for other contemporary integrators like Kostyleff (1911), who also

claims a supplementary role of introspective psychology of thought in the Würzburg style and reflexology, it is a central issue whether they were really successful in this integration, or they only provided a list of the new approaches. The importance of these integrative attempts is relevant for our purposes here, since Popper was influenced by such an integrator in Vienna, the freshly appointed Karl Bühler. (For the impact of Bühler on Popper, see Millar, 1997, in his biography of Popper.)

Karl Bühler (1927, 1934, 1936, 1990) at the Department of Psychology and at the Teacher Training Institute of the Vienna University, represented some key ideas that were to become crucial in the ideas of Popper. (For a detailed analysis and evaluation of Bühler's work, see the volumes edited by Eschbach, 1984, 1988).

Bühler was trying to overcome the divisions of contemporary psychology. Thus, he belongs to the class of those Central European scholars who are looking for a meaningful unity in their science, while being aware of the divisive naturalistic and spiritualistic trends.

> *When someone raises a new topic, why does he have to look down scientifically on his neighbor? In the large house of psychology there is room for everyone; one could direct his spectacles on the skyline of values from the attic, others could at least claim for themselves the basement of psychophysics, while the walls are intended to open the entire enterprise into the causal chain of events.*
> (Bühler, 1927, p. 142)

Some of his ideas, important for the intellectual portrayal of Popper, were all concentrated on a need for the unity of psychology and on the idea of a sign-based theory of human cognition. These can be summarized in the following statements:

– Human behavior is oriented to suprainvidual meanings.
– The representational function of human language is the crucial aspect of language.
– An evolutionary organization of behavior is postulated.

The organizing ideas of Bühler – the idea of species-specific behavior based on Gestalt-like organizations – were crucial for many followers of Bühler. The personal impact of Bühler is given a vivid portrayal by Kardos (1984), and the entire group of his followers is given an interesting portrayal in the volumes edited by Eschbach (1984, 1988) as well as Nyíri (1992). **Table 5.3.** presents the breadth of his impact on twentieth-century intellectual life.

Bühler's work has two characteristic features that are in harmony with the work of the later development of his students.

The first notable idea is *the integration of early ethology into the natural foundations of psychology,* his emphasis on a functional biological view, on the organization of behavior rather than simple psychophysiology. There are no saltations in behavioral development; rather gradualism and the organizing force of selection all over the place characterize it. Bühler postulates three levels of selection.

Table 5.3. Students of Karl Bühler and some of their ideas

Continued topic	Student, follower	Continued topic
Gestalten	Kardos, Brunswik	Constancies, sign theory of perception
Animal behavior	Konrad Lorenz, Paul (Harkai) Schiller	Releasers, behavior evolution
Language functions	Popper, Lorenz, Kardos, Jakobson	Anthropogenesis, culture, representation
Selection in development	Lorenz, Karl Popper, F. Hayek, Harkai, Schiller	Selectionist theory of knowledge, competition of ideas

> *For me, in Darwinism the concept of play field seems to be productive. Darwin has basically known only one such play field, while I point to three of them [...] These three play fields are: instinct, habit and intellect.*
> (Bühler 1922, VIII)

In this framework, animal behavior is assumed to be intentional and purposeful. Bühler in this regard follows more the ideas of Jennings (1909) than those of Loeb (1900, 1912). Intentions and signs organize animal behavior as well as human mental life: there is no demarcation line between human mentality and animal mental life.

Lorenz reports (1966) how early comparative psychology and the views of Bühler shaped his views on ethology with its central notions of an evolutionary analysis of behavior, the interpretation of species-specific forms of behavior, with reference to releasing stimuli and a species-specific articulation of the *Welt* into an *Umwelt*. This impact shows up in Popper (1963, 1972) as well, in the form of characteristic cross-references. Not only Bühler himself but both Jacob von Uexküll and Konrad Lorenz become unavoidable references for him. The issue of the proper place of Gestalt principles, as principles of a new psychology (we should not forget that Bühler was among the first systematic proponents of a Gestalt-based view of organization in perception and mental life, [Bühler, 1913], only to return to this at the end of his life, in 1960). Lorenz (1966) certainly showed an impact of the idea of Gestalt organization in animal life. However, as he expresses in his posthumously published *Russian Manuscript*, Lorenz did not become a scientist suffering from some kind of Gestalt preference. When he talks for instance about the releasing stimuli he emphasizes that they look like Gestalts, but in fact have a more elementary organization.

The *unity of biological and meaningful elements in human life* is the second lasting impact of Bühler. This is easily dismissed as eclecticism. It certainly has a permissive aspect as Bühler himself emphasized in his *Crisis of psychology*:

> *If someone surveys the rich empire of psychological research today, one can find useful contributions and converging efforts interesting from all domains. The distance between the integrated behavior of the amoeba and human scientific*

thought is certainly impossible to grasp. Still, on the basis of the most modern observations both can come under two common concepts: they are holistically organized and are characterized by meaningful events.
(Bühler, 1927 p.)

Intention-based, teleological and holistic organization is true of all behaviors, and it creates unity between the work of biology and that of the spirit. In his book on the crisis of psychology and then in his theory of language (Bühler, 1934), this is presented as a detailed theory of three maps of human behavior as well as three functions of language. Human language has by necessity three functions: it has an experiential reference, it is an *expression (Ausdruck)* it has a relation to other people's behavior, i.e., it has a *directive function (Appel),* and most specifically, it represents something, it is a symbol *(Darstellung)*. According to Bühler, this tripartiality is characteristic not only of language. It is also a story about the triple aspects of the human condition: the inner world, behavior, and reference to something external and objective is crucial to all mental life. Bühler in this regard speaks of the general semiotics of behavior (see Pléh, 1984, 1985b).

Prefigurements of World III: Reality of abstractions

This second aspect is relevant for Popper, not only in his treatment of language functions, where he adds the argumentative function as a new proposal, but also in the entire conception of the World III. In the formative years of "spiritual organization" as a topic of psychology, and in general the interest in matters pointing beyond experiences it emerged in several alternative forms. In the German-speaking world, it mainly had two forms. One was the mental science psychology of the Dilthey–Spranger line, that, among his many problems, tried to separate the natural and the cultural trends in psychology as criticised by Bühler (1927). Mental science psychology is not only a value-oriented approach in psychology, but also an ostensively non-causal, interpretive science. Popper (1972, pp. 183–190) clearly criticized this "understanding" objectivism. He felt that even hermeneuticians themselves, while criticizing "scientism", assumed a certain unity of science.

The other approach to objective spirit tries to overcome traditional psychologism by trying to find connections with modern logics initiated by Frege (1892) and represented in the Platonicism of Husserl (1900–1901). In this view, individual mental processes point towards supraindividual mental organizations. One can touch upon this even in the laboratory by highlighting the non-sensual *(unanschauliches)* character of thoughts emphasized especially by Bühler (1907, 1908). Our thoughts, as the leader of the Würzburg school proposing a logical approach to psychology pointed out, are always directed towards something beyond themselves, something objective, to thought structures (Külpe, 1912).

Thought thus can be directed to objects that are of a very different nature from it and become by the fact of being representation pure mental contents, or pure

thoughts. Experimental research not only clarified this to be the case [i.e., in the interpretation of the Würzburg group, Cs. P.]*, but at the same time it showed that represented objects can have different status …, and therefore their relations to thinking might be of a different kind. This should be understood here as a differentiation between concepts and objects, and among these latter ones ideal, real and represented objects.*
(Külpe, 1912, p. 1088)

Bühler (1927, 1934, 1990) in his theory of language where the central role is attributed to the descriptive or representative function, tries to provide a finer articulation of this world of thought compared to his master, Külpe: this supraindividual intentional world is provided by linguistic meanings. Wettersten (1988) and Musloff (1990) point out how the linguistic analysis provided by Bühler took up the unfinished objectivist attempts of Külpe, and went beyond a mere demonstration of early *Denkpsychologie* that thinking cannot be a mere flow of images. Bühler (1922, pp. 359–430) himself shows his affinity to the relationship between Husserl's logic and *Denkpsychologie* even in treating the development of thought in children. Holenstein (1973) gives a solid overview of the Frege–Husserl–Külpe line, while Kiesow (1988) even attempts to show how the objectivist attempts of Külpe through the linguistic theory of Bühler influenced the World III conception of Popper. There are a few things to be remarked here, however. First, as Kusch (1995) analyzed it very precisely, this entire move towards an objecticist-platonist-logical psychology was taking place over a minefield. That was the debate over psychologism in early twentieth-century German psychology. In my view, Bühler was on the one hand in the uneasy position of defending the reality of abstractions in directing human life, and on the other hand, at the same time, defending naturalism with a strong Darwinian flavor. And it is my conviction as well that this dual heritage was the legacy and the mission of Popper as well. At some stages of his intellectual carrier, he emphasized the objective formations such as World III, while at other stages he stood for a selectionist biological view of knowledge. Usually readers of Popper emphasize that many of these Viennese and psychological topics such as evolutionary epistemology appear relatively late in his *oeuvre* in a clear public form. However, they are always assumed as a sort of background. Even his campaigns in political science, e.g., for an Open Society (Popper, 1945) are actually applications of the idea that systems with a dual organization are superior to single circle feedback loops; i.e., systems in which the sources of novelty and the decisions about their value (adaptation) are independent cycles without feedback from selection to innovation, are more efficient in biology, learning, and social life as well.

Another aspect is his actual relationship to *Denkpsychologie* in his doctoral dissertation. As Ter-Hark (2002) points out in his study of Popper's dissertation, he not only did his PhD under Bühler using the methods of Denkpsychologie, but his entire argumentation shows signs of intellectual indebtedness to Otto Selz (1913, 1922) and Külpe (1922). Ter-Hark (1993, in press) claims that for Popper Selz was a model for a biological, non-dogmatic approach to thought processes. In a way, one of the crucial points of Popper's unpublished dissertation would be his struggle for non-dogmatic, critical thinking in education, i.e., in socializing thought. Thus, one could claim togeth-

er with Ter-Hark that the excursion to *Denkpsychologie* for Popper was not a total aside: rather it was already raising some of the key issues that showed up in his first work on the philosophy of science, published only much later (Popper, 1979).

Popper followed the path set for him by Selz, Külpe and Bühler in two respects. He rejected the traditional sensualist reductionism of psychology. This shows up in his *unended quest,* in his autobiography (Popper, 1976), as a triumphant overcoming of the problem of induction in the theory of knowledge. And at the same time, Popper attempts to give a biological interpretation of the mental domain (Wettersten, 1988). Both the biological attitude and the reference to the realm of thought representations as being active forces in our mental life are characteristic features of Popper's later epistemology as well, after his classic, more formal works (Popper, 1935, 1959). In fact, the reemergence of biological ideas in his social works (Popper, 1945), as well as in his later epistemology shows the deeply rooted nature of the early mental templates and their impact throughout his entire life.

The process of research and individual cognition

Be it naive and up to criticism both from an epistemological and from a philosophy-of-science point of view, for the psychological relevance of Popper, it is crucial how he raised again the affinity between our views on the empirical cognitive processes of the individual knower and scientific knowledge. (See Cassirer, 1951 for the European context). I will not try to decide whether the parallels assumed by Popper between individual knowledge acquisition, epistemology and theory of science are sound or not: this would involve an excursion into the evaluation of Popper on the large, and I am mainly concerned here about his impact on psychology.

The reconsideration of Popper in psychology, or the redefinition of the affinity between epistemology and psychology given by him is related to his *critic of induction*. Modern thought entertained two psychological visions of man: the inductionist view, originating at least from Francis Bacon, and the deductive tradition, going back at least to Descartes. Either the individual human being is an inductionist learning machine – as conceived today by the connectionists – whose knowledge like the organization of science itself basically consists of the accumulation of pieces of knowledge (for a treatment of connectionism along these lines see Clark, 1989), or the unfolding of the human mind is driven by ready-made structures – knowledge being the development of structures out of other structures.

We know rather well how simplified this is, with respect to the history of science. A psychologist should know that both processes, bottom-up building and top-down structuring do exist both in the unfolding of the human mind and in the organization of knowledge. This is trivial for psychologists at least from the time of Piaget (1970), who tries to treat both child development and the development of sciences with his pair of notions: assimilation and accommodation. It is an interesting aspect for a history of ideas that attempts to overcome this duality showed up in early flirtations between psychology and the neopositivist-operationalist philosophy of science. Stevens (1939), who was a key figure in making European and American neopositivism bear upon psy-

chology, puts the emphasis on the creative style. Following the metaphor put forward by William James, the hard-headed empirist "goats" and the soft-headed rationalist "lambs" should be taken as supplementary empirical and formal (mathematizing) poles that have to be united in creating a new psychology.

Popper follows another route. For him, the redefinition of the relationships between epistemology and psychology should not be looked for in the structure or organization of knowledge, but in our vision of the modes of knowledge acquisition. There is no knowledge without hypotheses; there is nothing that could be called an innocent eye. All knowledge, in line with his critic of induction, starts from questions. And in this respect, he sees an interesting parallel between everyday knowledge processes of "ordinary beings" and matters of sciences. In Popper's evolutionary epistemology, whatever he says of science and of "ordinary knowers", of their psychology and biology, is united in a way as at the beginnings of modernity. Epistemology comes together with a vision of man. Today, however, and this was especially true of Popper, this is not necessarily accompanied by a reductionist psychologism.

Popper proposes a solution both for the psychologist and for the historian of science. He postulates an analogy between the biology of knowledge, the psychology of knowledge and scientific creation. In the most programmatic way, this was done in a short paper of his which was also included in an introductory psychology reader (Popper, 1970). The issue of induction in science, claims the mature Popper, can be resolved by reminding us that in general there is no uninstructed, empty organism. All acquisition (learning) starts off from a hypothesis. In simple cases, the hypotheses are provided by the evolutionary genetic heritage (Popper, 1972, p. 259). In the most complicated cases of modern science, they are provided by scientific tradition, by a "state of the art".

Popper (1970) contrasts the image of a well-equipped man who starts off from hypotheses with the doctrine of pure observation, with the Baconian image. The real demarcation point according to his advice to students is not in falsification (this is the demarcating feature of elaborate scientific theories), but in a peculiar attitude: rather than looking for justifications (that lead to authority in science), we have to be driven by a need to test. Along this line Popper gives interesting advice on a real honest scientific writing style. It should not follow the accepted canon (question, hypothesis, experiment, discussion). Rather, it should start off from a characterization of a real problem situation in exposition (recent outlines of a research hypothesis are never of that kind: they are reconstructed hypotheses), and it should discuss at the end how the matrix of issues changed after our research. The Darwinian inspiration has a methodological message for Popper: it shows the importance of theory. "We do not start form observations, but always from *problems* – either from practical problems or from *a theory that has run into difficulties"* (Popper, 1972, p. 258).

Selectionist thought

Popper's view of cognition is not only anti-inductionist and hypothesis-centered, but it claims a certain type of economy at the output end. These were already summarized in **Figures 5.1.** and **5.2.**

62

In my reading of Popper, the single most important general idea of Popper is his selectionist metatheory, emerging time from biology and psychology at the same, and showing inspiring parallels with recent developments in psychology. The selectionist view that appears in many areas of intellectual life today that postulate two basic building blocks. The first one is the idea that the origin of organization starts off from a *generating system* that creates many varieties in the outset. This is followed by a *selection system* that applies some filtering criterion to these varieties.

In his Spencer lectures, Popper characterizes the analogy with natural selection in the following way: "the growth of our knowledge is the result of a process closely resembling what Darwin called 'natural selection'; that is *the natural selection of hypotheses"* (Popper, 1972, p. 261). And in the dialogue part of the Popper–Eccles book (Popper, 1977, p. 431), he goes on to say: "on the highest and latest level of the process … in fact it uses the same mechanism for elimination, the trial-and-error procedure, 'fabricating and fitting' that are used on lower levels."

The Viennese origins of this extended usage are clearly shown is his quotations as well as in his metaphors. His favorite quotes in characterizing the role of trials (e.g., Jennings, 1906, see for example Popper, 1972, pp. 24, 183, 245, etc.), and his metaphors e.g., regarding the behavior of the amoeba (ibid, p. 24) can all be traced back to Bühler (1922, 1927). In the same way, when he moves on to the ideal of a hermeneutic human science, studying Dilthey's tradition, his first move is to remind us again of the complexity and meaning-relatedness of the behavior of an amoeba (Popper, 1972, p. 183; Popper, 1996). These are again commonplaces in Bühler. In my view, the crucial work in this regard is Bühler's (1922) synthesis of child psychology with its several editions. The three 'play fields' emphasized by him, namely *instinct*, *habit* and *intellect* correspond to a modern interpretation of extended Darwinism. **Table 5.4.** shows a contemporary interpretation of these views.

The real feature of a disctinctive value is the issue of what a Darwin-type selection is valid for: thus biological individuals, pieces of behavior or the world of thoughts **(Table 5.4.)**. The level of behavior corresponds to the notion of learning by trials, introduced by Thorndike (1898) and already analyzed by him with a Darwinian selectionist terminology, while the selection of ideas and thoughts, insightful learning were described by Köhler (1917) and much analyzed by Bühler. In the case of habit formation, the challenge is not our being but the survival of bodily movements. Popper

Table 5.4. Karl Bühler's (1922) reconstructed view of the three fields of selection

Characteristics	Instinct	Habit	Intellect
Pool of selection	Individuals	Behaviors	Thoughts
Roads to selection	Darwinian selection	Reinforcement	Insight
Proofs	Species-specific behavior	Associations, new combinations	Detour, contemplation
Representative author	Volkelt, Driesch	Thorndike	Köhler
Organization	"Naturplan"	Associative net	Mental order

repeats the conception of Bühler almost in a verbatim way when he expresses at many points that we risk our hypotheses instead of ourselves: "So we can say that the critical or rational method consists in letting our hypotheses die in our stead. It is a case of exosomatic evolution" (Popper, 1972, p. 248).

Bühler has a way to move over to intellect. He goes on comparing the levels: "If movements themselves become too costly, or it is impossible to execute them, then the field of selection moves over to ideas and thoughts" (Bühler, 1922, p. 435). Thence, selection continues on paper, on models, on thought experiments, which is a cheaper solution. Intellect is of a higher level in this economic sense. Though Bühler himself does not talk here of science, his examples – inventor, poet, scientist – clearly show how he imagined the actual generalization of the selection principle in all intellectual work.

Popper is aware that vis-à-vis the selection models he creates a part of a long series. He is aware of his unique originality here, however. It is not only the fitting of science – and art as well, see Popper, 1972, pp. 253–255 – into this line but a reconstruction of the theory of science where logic and the infamous critical method are "only" (?) newer tools for error elimination. Popper (e.g., 1962, 1972, 1996) also sees an emergent evolutionary relationship between these levels: they are not only homologous but they are assumed to have a common causal history as well.

Through the mediation of Popper, similar ideas show up in later extended Darwinian approaches as well. The three levels of Bühler roughly correspond to what Dennett (1994, 1996) calls Darwinian, Skinnerian and Popperian creatures. In fact, within the group of Popperian creatures that is characterized by selection of ideas, he differentiates a further subgroup: Gregorian creatures after Richard Gregory (1981), the British cognitive scientist. This would correspond to the classical idea of *homo faber*. Tools themselves would be carriers and shapers of thought. For Dennett (1994), this is the critical way to differentiate skyhooks from cranes. "Skyhooks" would be supernatural agents that are used to supplement the blind forces of evolution, while "cranes" would correspond to Popperian World III forces. They would allow for humans being influenced by the tools and results of their own culture. This would, however, not extract them from the validity of universal Darwinism.

Table 5.5. Different examples for the generation-selection view
(for the last two lines see Osborne, 1965 and Hayek, 1967)

Domain	Generation	Selection
Darwinian evolution	Mutations	Natural selection
Learning	Trials	Error elimination
Science	Hypothesis generation	Critical discussion
Brainstorming	Generation of ideas	Critical selection
Market economy	Products	Invisible hand

Popper's position and some conceptual issues in present-day selectionist thought

Popper is his mature writing on evolutionary epistemology was well aware of how important selectionist thought has become for the explanation of behavioral evolution. When he makes excursions to contemporary biology, he realizes that the selectionist view within biology itself has taken an internalist turn. That is to say, the idea of *endo-somatic* cycles of selection emerged. With a very keen sense for novelty, Popper realizes the important new ideas in this regard in the selectionist reinterpretation of immunology in the work of the Danish immunologist Jerne (1955, 1985).

It is interesting that later developments in neuroscience extended this into a theory that has even clearer affinities with the issue of behavioral evolution. This is the idea that selection cycles play a key role in the formation of neural circuitry over the individual's life. This idea known as Neural Darwinism imagines that the internal selectionist cycle of habit formation, as referred to by Popper, has a neural basis (Changeux, 1983; Changeux and Dehaene, 1989; Edelman, 1987, 1989). Beside the outer cycles of genetic Darwinian evolution, the somatic, internal cycle would select (stabilize) certain cortical neural nets. In detail, this in fact postulates and demonstrates several cycles in the nervous system over the course of individual development, the first cycles being responsible for the setup of the neural net itself, and the second cycle for synaptic tuning that would correspond to certain concepts or ideas. Putting aside the details, the essential point is that the selection agent, which was assumed to be error elimination through reinforcement based on learning in the traditional habit model, here becomes mainly a perceptual learning cycle based on repetition.

The selectionist metatheory is actually put into an entire broad framework of possible processes of modification. Gary Cziko (1995) in his classifying attempts for knowledge systems and their acquisition in fact groups existing theories into three types, as summarized in **Table 5.6.** In all kinds of knowledge change processes, he claims, one can differentiate between static externalism which he calls *providence,* where knowledge is predetermined, before the knowing system gets into interaction with the environment. Before we dismiss this attitude as being relevant only for a history of ideas approach, we should remember that in many ways representants of the strong innatist group in cognitive science like Fodor (1975, 1990) could be interpreted as providentialists. (In fact, Cziko, 1995, p. 285 classifies not only Fodor, but even Chomsky to be a providentialist.)

Present-day theories of system change usually contrast selectionist and instructionist models in a rather systematic way regarding the sources of order as well. **Table 5.7** shows how we can interpret the duality in Cziko's model as a theory of the birth of order as well.

For most of the history of behavior sciences, *instructionism* was and still is a more interesting alternative than providence. In instructionism, the source of knowledge is the environment, and basically an empty organism is postulated which is filled with information from outside. Most of traditional empiricist learning theory is instructionist. But even present-day alternatives to the innatist models of development like Elman,

Table 5.6. Different sources of knowledge (after Cziko, 1995)

Theory type	Knowledge source	Biological example	Behavioral example
Providential	External omnipotent	Creationism	Innateness
Instructions	Environment	Lamarckism	Empiricist learning
Selectionist	Feedback from trials	Darwinism	Error elimination

Table 5.7. Sources of order in the instructionist and selectionist vision

Theory type	Knowledge source	Biological example	Behavioral example
Instructions	No knowledge, chaos	Imports knowledge and order	Order out of chaos
Selectionist	Preformed or early multiple solutions	Selects and tunes solutions	Tuned and selected order: order out of orders

Bates, Johnson, Karmiloff-Smith, Parisi, and Plunkett (1996), though they do not suppose an empty organism, still consider that the most important inner models are reflections of real world contingencies, as it should go for connectionist models. Selectionist models in this general sense assume an active organism that creates internal models and the environment selects the relevant ones from these. The interesting new development during the last two decades was that the selectionist model was extended to the development of behavior as well. The parameter-setting approach to language acquisition is a prime example: environment certainly plays a role in language acquisition. It does not create structures *ex nihilo*, however, but it consolidates the parameters of the system that are activated as options within the system itself; they are evolutionarily given organism-based hypotheses. Chomsky (1986) and his followers (Mehler and Dupoux, 1986; Changeux and Dehaene, 1989; Piatelli-Palmarini, 1989) are in nontrivial harmony here with the ideas promoted by Popper.

The instructionist approach to the development of behavior can be portrayed with scheme (1).

(1) *Environment* $\longrightarrow$ *Organism* $\longrightarrow$ *Behavior*

Here the only creative agent is the organism. The selectionist attitude is better portrayed with (2).

(2) *Organism* $\longrightarrow$ *Behavior* $\longrightarrow$ *Environment*

Selection

The above scheme is remarkably similar to portrayals given by Popper (e.g., 1972, p. 287) shown in (3). These indicate that all knowledge starts off from a problem situation (P_1), followed by organism-based tentative theories or solution attempts (*TT*), to be followed by error elimination (*EE*) based in the environment, and ending in a change of the problem space (P_2) which would in our case be a changed knowledge state.

(3) $P_1 \longrightarrow TT \longrightarrow EE \longrightarrow P_2$

The relationship between different types of selections is non-trivial regarding culture. As **Figure 5.3** indicates it, following Cziko (1995), there are some rather special types of selectional processes that correspond to the organization of culture, and even education. Most cultural processes would be constructive selections, i.e., selections which produce new entities. Furthermore, most of the cultural phenomena, which are traditionally called learning are cumulative as well: selections do not merely add up, they also accumulate. The nature of this accumulation and its relation to evolution is a rather controversial issue: it relates to the problem of the specificity of behavioral evolution.
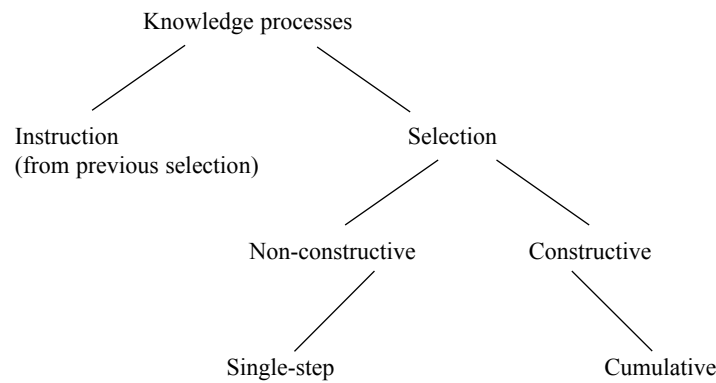
```
                     Knowledge processes
                    /                   \
         Instruction                    Selection
         (from previous selection)     /          \
                        Non-constructive           Constructive
                       /                                      \
                 Single-step                                Cumulative
```

Figure 5.3. Three types of selection according to Cziko (1995, p. 309)

Popper himself always emphasized the importance of selection. Organisms endowed with hypotheses, especially with hypotheses of a genetic origin are apt to solve paradoxes of inductionist learning theory, not only inductionism in the theory of science. Chomsky (1968, 1986, 2000) and his followers, like Bickerton (1981, 1983) discovered Peirce' theory of *abduction* as a special kind of acquision mechanism. The growth of our knowledge is an experiential modification of our hypotheses: it is neither a mere deduction nor a mere induction: it is setting or tuning our deductive systems (theories) with data.

The induction chapter of the Chomsky–Piaget debate (Piatelli-Palmarini, 1979) clearly shows this affinity between Popper and the followers of Chomsky. There are but two moments that separate them. For Fodor (1975), and for many of the followers of Chomsky, the list of innate knowledge is rather lenghty (nothing could be acquired

if it was not known beforehand). Fodor (2000, p. 5) claims what he calls "local mental processes" to be "innately specified" in their architecture. Popper would be more cautious in claiming innateness. On the other hand, in the interpretation of innateness according to Fodor (1975, 2000) one has to claim a predetermined system organized into propositions or databases. The more cautious Popper would rather talk of preferences and skills (Popper, 1972, pp. 256–284) being innately organized, following his idea about hypotheses being the driving force for all changes. This would be more in line with more flexible theories of the role of innateness in human development, especially the modularization theory of Karmiloff-Smith (1992), as well as the learning theory supplemented by innate initial conditions of Elman, Bates, Johnson, Karmiloff-Smith, Parisi, and Plunkett (1996). These differences are routed in attitudes: for Popper, as well as for the learning-oriented theoreticians of development, the emphasis is always on the ever-changing problem situations of the organism, whereas in Chomsky and Fodor, it is on "knowledge" taken in itself.

With these differences notwithstanding, there is still a nearer affinity between the divergent Popperian and Chomskyan visions: their preference for *selectionist rather than instructionist principles of learning and change.* Popper, following Medawar (1961), already in his Spencer lectures in 1961 (!), pointed out that the knowledge of the world is not based on instructions, rather, it is based on challenges, it is *evocative.* We learn from our mistakes, and the environment does not instruct us. This process can, however, emulate instructions (Popper, 1972, p. 266).

In his later works, though the most compelling biological works on Neural or Somatic Darwinism are naturally missing as points of reference (Edelman, 1987; Changeux, 1983), Popper tends to entertain a view that would be in line with a selectionist conception of learning. Already in his *Evolutionary epistemology* paper of 1973 (1985), on the basis of early selectionist immunological work by Jerne (1955), Popper emphasizes that experience only selects from repertories that have their sources in other domains. Using a favorite expression of Gombrich: "making comes before matching", Popper (1985, p. 86) stands for a view where "the active production of new rival structures comes before its exposure to eliminating tests".

The special status of behavioral evolution

Not only for psychologists, but for social sciences at large as well, it is crucial to see the more specific status of behavioral selection in universal Darwinism. Popper himself in his Spencer lectures (Popper, 1972) clearly saw the specificity issue here. He even gives a historical flavor to his argument by saying that "even if Lamarckism is false, it should be respected by Darwinism as a first approximation to Darwinism" (Popper, 1972, p. 269). He tries to give a crucial role to active behavior in evolution. In this way, the role of activity gets combined with the issue of the relationship between levels of selection.

Basically, he postulates that there are two aspects of complicated organisms, behaviors with inherent goal-setting properties of the organism and changes in executive organs. Changes in the behavioral aims and propensities (the goal aspect) always pre-

cede changes in the executive system. In this process, we have something that "simulates Lamarckism". In a way, Popper in this regard is similar to Piaget (1976): he believes in behavior being a driving force of evolution in animals with complex behaviors. This attitude, as Popper (e.g., 1972, pp. 268–269) was aware of it, is in fact similar to what we refer to as Baldwin effect in the history of evolutionary psychology. The effect is named after James Baldwin (1896), an early American evolutionist who was looking for general mechanisms to speed up evolution without any recourse to simple Lamarckism. He proposed imitation, trial-and-error-like learning, and feedback through modification of the environment through generations as boosting mechanisms for evolution. The last one (the Baldwin effect) means that behavioral changes have an impact on the environment, and therefore have an impact on the likelihood of the survival of some types of mutation. In this way, then, strictly Darwinian mechanisms may emulate Lamarckian effects.

Popper phrases his preference for behavioral changes being primary in the following way: "the evolution of the executive organs will become directed by that [behavioral] tendency or aim, and thus [seem to be] 'goal-directed'" (Popper, 1972, p. 278). A special case along this line would be the case of *behavioral or ethological monsters*. Great leaps in the case of executive organs would result in most of the cases in lethal mutations. Behavioral monsters, however, that is behavioral mutants characterized by great leaps, could easily be conceived to be able to survive. And this may set up a specific niche selection procedure. "Behavioral novelty leads, if successful, to the selection of those ecological niches which in their turn oparete selectively […] and thus exert a selection pressure in a partly predetermined direction" (Popper, 1972, p. 283). In this way, in a rigorously causal way, we obtain a system that emulates Lamarck. Interestingly enough, some recent models in the evolutionary theory of behavior and culture, like Laland, Odling-Smee and Feldman (2000) also start to claim that niches have a special role in behavioral evolution: they modulate the selection environment. Therefore, species with a relatively flexible behavior may influence the selection pressure by acting upon themselves, by selecting certain types of niches. Laland, Odling-Smee and Feldman (2000) claim that this type of effect acts as a mechanism that is coming between simple animal niche effects such as the impact of nesting on the selection pressures in certain species, to the level of culture like the impact of human institutions on the selection pressures acting on humans. They also clarified that the special interaction between genetic and cultural evolution can be conceived in two directions: not only can niches foster certain types of selections, such as a diminution of agressivity due to communal living, but they can also reduce selection pressures altogether.

Popper (1996, Chapter 5) when he gave talks at meetings of evolutionary psychology, clearly saw the relationship between the issue of cultural evolution and his ideas about World III.

The primacy of generation or selection

In any overall model of selectionist development, a crucial issue is whether *generation or error elimination* is the most crucial moment. It is noteworthy in this regard that not

even mentioning Thorndike (1898), but talking in abundance about acqusition based on *trial and error*, he is repeatedly stuck with the expression of "trial and error" itself. He proposes to replace it with *learning by elimination of error* (Popper, 1972). This vision, as well as the entire world view of the critical method would opt for the primacy of selection. In another places, however, he repeatedly comes back to the issue of how important it is to have several solution proposals, both for the idea of Open Society, and for cognition as well. Regarding science, in contrast to traditional dialectics, he claims that he advantage of the trial-and-error method is the production of several hypotheses, while dialectics starts off but from a single idea has "the method of trial-and-error is the method of elimination. Its success depends mainly on three conditions, namely that sufficiently numerous (and ingenious) theories should be offered, that the theories should be sufficiently varied, and that sufficiently rigorous tests should be made" (Popper, 1963, p. 313). Regarding selection in the world of living, he points out the importance of the richness of variation provided by life. Thus, variety and selection together provide for evolution. This is, of course, the attitude emphasized by the reconstructions of the Darwninian argumentation itself (Lewontin, 1970).

Bence (1990, Chapter 3, especially p. 126) when surveying the debates about Popper's view of science, points out that for Popper, the essential moment is not the avoidance of mistakes, but the merciless elimination of errors. This vision of human nature is also rooted in Darwinian theory, where the sources of variations (mutation) and adapting filters are not related. Similarly, in the world of cognition, it would not be good to have crosstalk between generating solutions and evaluating them. The only new moment is that in order to create variations, we do not have to face too many risks since we can make variations in our mind. The late Popper himself clearly saw his theory of science as an extension of his general approach to knowledge acquisition as being a process of testing hypotheses.

The mature Popper, as Millar (1997) also points out, withdrew his criticism of Darwin as a world view, and therefore as a non-scientific theory (Popper, 1945). The Spencer lecture (1961) clearly shows the birth of evolutionary epistemology. The essential idea of Darwin from this moment on is not the proposal of any general laws of evolution, but rather the idea that "it is *in principle possible to reduce teleology to causation by explaining, in purely physical terms, the existence of design and purpose in the world*" (Popper, 1972, p. 267, italics in the original).

In *Of coulds and clocks* (Popper, 1972, pp. 241–242), Popper even talks of a danger of tautology in Darwinism. Without a separate theory for fitness, it would come to suggest that "survivors survive". His own theory of evolution about efficient control systems through trials and selection (Popper, 1996) would be one attempt in this direction.

It is of some interest that since that time, this issue of possible circularity and a foundation for adaptive value have become central to evolutionary theorizing. One aspect is the *exaptation–adaptation relation.* In this literature, the danger of tautology pointed out by Popper is raised as a critic of the *panglossian paradigm:* if according to our superadaptationist strategy increasing fitness would explain everything anyway (everything in the living world would be useful), then the actual nature or character of the world is a proof to its being the most perfect one. The existing varieties of the living would be the best ones, since they survived. Gould and Lewontin (1979), intro-

ducing this issue in a critical argument, pointed out that this is similar to claiming that the sprandrels of cathedrals were formed in order to decorate them with paintings. Rather, as Gould and Vrba (1982) proposed, exaptations should be postulated beside adaptations. Some formations are created not because a selection pressure is directed to them, but as side effects of other evolutionary pressures. Later on, they can become crucial in the birth of other processes.

The ratio of adaptations and exaptations became a topic of crucial debates regarding the origin of human language. Chomsky (1986) is on one of the poles by claiming that the really interesting features of human language do not have a functionalist adaptive explanation. Language is an innate, genetically specified system, but as such a by-product of evolution. The large camp of the adaptive functionalists engaged in a detailed debate with the paper of Pinker and Bloom (1990, see also Pinker, 1997). The debate around this paper (the paper itself claimed a functional explanation even of the most extravagant features of human grammar) made it clear that there is no all-or-non question here. Rather it is an issue of the ratio of adaptations and exaptations in the birth of specifically human adaptations.

Recent theories in evolutionary psychology (Barkow, Cosmides and Tooby, 1992; Cosmides et al, 1994; Cosmides and Tooby, 1992) revitalized the strong adaptationist program: they tend to claim that most architectural features of human cognition, as well as many of the contents are the results of specific selection pressures in an ancestral environment. This view, of course, raises new debates about the proper vision of the architecture of human cognition. But considering this would lead us far away from Popper, to the middle of present-day cognitive debates.

6. REMEMBERING THE COLLECTIVE MEMORY OF MAURICE HALBWACHS

The issue of sociologism in psychology

The ideas of the French sociologist, philosopher and theoretical psychologist Maurice Halbwachs (1877–1945) seem to be slowly integrated into the tradition of social sciences, after decades of forgetting. Following the publication of his posthumous main work in English (Halbwachs, 1980), his name showed up in discussions about the social determination of knowledge (Coser, 1992a; Schwartz, 1996), and regarding the issue of how constructed our historical consciousness is, and how the professional study of history is related to the study of memory processes (Hudson, 1993). He shows up in radical constructionist alternatives to social psychology as well (see the volume edited by Middleton and Edwards, 1990, and the paper by Hirst and Maner, 1995). The present chapter mainly intends to show how his approach is related to the problems of a radical sociological reduction in psychology.

There are two basic reasons for a historical reconsideration of Halbwachs. The first one has to do with a proper and broad consideration of social theories as explanatory models in psychology. The well-known models argue for a social model of the mind on the basis of socialization, development, and interaction (J. M. Baldwin, L. S. Vygotsky, H. Wallon, G. H. Mead), and are presented as such by the new constructionist movements (see Middleton and Edwards, 1990). Halbwachs continued another path: for him, the phenomenological analysis of the individual mind and the analysis of the constructive processes in seemingly straightforward historical phenomena, such as the pilgrimages to the Holy Land (see Halbwachs, 1941, 1950, 1992) constitute the basic arguments and data for a social epistemology. This attitude to his data gives his work a recently rediscovered relevance regarding the methical issues of history writings (Hudson, 1993, pp. 73–90).

The work of Halbwachs is related to the more general issues of social theories of knowledge as well. Regarding the communal or social externalist theories in science studies (Bloor, 1983, 1991; Latour, 1993; Shapin, 1992), Halbwachs is full of interesting lessons. His work shows that radical sociologism existed in the between-the-wars period not only for science but for human cognition at large. Schwartz (1996) even claims in his comparison of Karl Mannheim (1936) and Halbwachs that both were reactions to the disruption of continuity in World War I. It is a non-trivial parallel between Halbwachs and the recent "strong program" of science studies that the categorization theory proposed by Durkheim and Mauss (1903) is used by both of them as a starting point (Bloor, 1982). The second relevance of Halbwachs comes from his treatment of the status of "raw knowledge", and his relationships to two system theories in theoretical psychology of his time.

Sources of Halbwachs

Both the life and the work of Halbwachs are a combination of two traditions that are rather neglected in the modern self-consciousness of psychology: the traditions of the speculative holism of Bergson and the idea of social representations proposed by Durkheim. As Friedman (1968) describes his life, Halbwachs was a student of Bergson at the prestigious Lycée Henry IV in Paris, and a student and follower of Durkheim in his mature career. He contributed to research on suicide and on social classes, beside his theory of collective memory (Halbwachs, 1912, 1978). His entire theory of social memory could be characterized as a social interpretation of the duality proposed by Bergson (1896) between memory as a habit system and real "pure memory". (For the impact of Bergson on Halbwachs, see Coser, 1992b). From Bergson, he took over the dissatisfaction with early reductionist elementaristic psychology. But he turned this dissatisfaction into a general non-individualistic view of the mind, an overall social reduction of psychology through an extension of the notion of social representations he took over from Durkheim (Halbwachs, 1918).

Halbwachs is dissatisfied with this early version of the two system theories. In his view, there are no such things like "raw memories": all memories are by necessity interpreted, and this interpretation is socially based. He is more radical than Bergson, and more radical than Durkheim himself. Durkheim basically believed that social representations are powerful forces shaping the individual mind, but he still left a place for individual factors in his view of social determination. Individual representations would somehow combine with social representations to form the individual's mind. This was radical enough compared to the trivial psychologism and individualism of most of his contemporaries.

Halbwachs and some of his contemporaries like Charles Blondel (1928) wanted to be more radical. They claimed more than the primacy of social representations. According to the radical Durkheimians, the social moment penetrates all aspects of the mental. Our mind left to itself would be empty or at least disorganized. Blondel (1928) in his textbook-like treaty gives a reconstruction of the Durhkheimian position, starting from Durkheim and Mauss (1903). The organizing principles of rationality emerge out of social representations. Classification is first of all a classification of people; the notions of space and time originate in the practice of religious communities, and so on. Both the framework of rationality and its content or substance come from social representations.

In this regard, Halbwachs represents an important type of minority approach to psychology i.e., social reductionism: the individual is a clear carrier of the social and there is nothing to it but a "cross point" of social representations and rule following.

The notion of collective memory

Halbwachs elaborated the idea of the prominence and ubiquity of the social in a series of works centered around a key notion: *collective memory* (Halbwachs, 1925, 1950, 1980, 1968, 1992, 1994). Halbwachs can be easily given a radical and at the same time

irrational interpretation. Bartlett (1932) saw in him a proponent of the idea of a "group mind", the belief in the reality of supraindividual mental phenomena. However, he can be given an interpretation *à la* Dawkins (1976, 1982) as well. The same way as our body is only a means for the survival of our genes, individual minds might be seen as tools or fields of action for the survival of social representations. Individual memory would be a way of existence for the socially produced "memes". The real unit of representation would be social representation and individuals would only be instances of its realization.

Halbwachs himself allows for this reading: "We can say that the individual remembers from the standpoint of the group, while group memory would be realized and manifested through individual memories" (Halbwachs, 1925, p. VIII). This is of course far from being a redefined theory of "group mind". It is an indication of a "stance" duality.

In understanding Halbwachs, it is important to emphasize that while he goes in a radical direction along the path indicated by Durkheim, his metaphors stop to treat social facts as *objects*. For Halbwachs, the social aspect is an issue of *intentionality*, an issue of the relationships between inner and outer objects. Duvignaud (1968) and Namer (1994), the French editors of his works, mention the influence of Husserl in this regard.

Social frames (*cadres* in French) of memory are contrasted by Halbwachs with the views on memory presented by Bergson (1896) and by the psychoanalytic school. Both are important for him since they deal with the most intimate aspects of our inner world of memory. For Bergson, the personalized world of "real memories" was an assurance for separating the realm of individuality from the world of the material. According to Bergson, humans live with a double standard of Ego *(Moi)*. For Bergson the real inner Ego is more important, while the other important factor is our life as constructed for society: our Ego is realized as an agent in the outer world. It is only natural that for Halbwachs the issue was to reduce the "inner Ego" to the latter, social one.

Bergson's famous book on memory attempted to clarify the difference between adaptive mind and the "Cartesian" inner mind. He differentiated between motor habits that would represent knowledge and adaptation and image-like *mémoirs-souvenirs* that would represent the detailed personal *souvenirs* of our Ego. The human brain would be a storehouse of habits, but merely an access route to personal *souvenirs*. Representations in the strict sense belong to an immaterial realm for Bergson. "Our body is a tool for action, and merely that for action. To no extent, and in no sense and from no perspective does it serve to prepare a representation even less to explain one" (Bergson, 1896, p. 253). Our intellect is realized in the continuous recontextualization of *souvenirs;* it keeps recreating our *souvenirs*. Its working mode is that of a continuous tension between motor habits and pure representation.

One could say following historiographers of psychology like Richards (1992) and sociologists of science (Bloor, 1983), that the original Kantian notion of *a priori* categories is given new interpretations in our century. For some, it becomes a biologically interpreted frame (Lorenz, 1941). For many, however, the Kantian *a priori* becomes a social schema. The idea of "pure representation" in Bergson has a similar fate in the hands of Halbwachs. Rather than talking about social categories and the communal

nature of research, he tries to provide a radical social interpretation of the everyday phenomena of memory.

Lacombe (1930), in his critical biography on Bergson as a psychologist, pointed out many inconsistencies in the dual system proposed by Bergson (dynamic and static, action and representation, episodic and categorial aspects are messed up in the examples of Bergson). Bergson, being interested in the personal aspect of memories, was unable to deal with "historical types" of memories, and with the issue of social constructionism at large. The notion of a specifically constructed *souvenir* for him was important only to show that persons are more than mere nervous systems.

Constructed memories are also needed by Halbwachs for something rather special. But while for Bergson they are "proofs" of a disembodied Cartesian individual mind, for Halbwachs they are proofs for the apparent nature of our individuality. It is a mere illusion that we live our own life and dream our own dreams. Both Bergson and Halbwachs use memory as an instrument to overcome a materialist-positivist world view. Their targets are different, however: one claims to prove the independence of individual consciousness, the other the primacy and force of collective representations.

Halbwachs (1925, 1992), in his original book on social frames, attempted to prove the primacy of the social frame through the analysis of the adult mind. Basically, he wanted to prove that both the frames *(cadres)* and the content of memory are social. A crucial moment in this argumentation is to show that the seemingly most personal moments of our life, like our dreams, also have a social character.

The easier approach was to prove the social nature of memory contents. Even our most intimate memories are about *social contents*. Even our dreams – here he takes issue with Freud – are put into a social setting. Our dreams and daydreams as well are full of social peers and interpersonal situations. Halbwachs criticizes his fellow Durkheimian, Charles Blondel (1928). According to Blondel, the material, or the "residuum" of our memory would be individual and only its frames would be social. According to Halbwachs, however, in its intentionality, the material of remembering is also social. As Duvignaud (1968) points out, this social intentionality inspired by Husserl gives a chance for Halbwachs to overcome solutions of a "group mind" type. The collective moment is the "intentional object" of our cognition and not a separate level. "Though collective memory obtains its force and content from the fact that it is a multitude of humans who support it, it is still only individuals who remember as members of groups" (Halbwachs, 1968, p. 33).

Furthermore, our acts of remembering are always *reconstructions* corresponding to our actual social situation. Aphasic disturbances thus are not simply disturbances due to lack of word images, but disturbances of exteriorization. The basis of the disturbance is the fact that for recall

> *what is needed is taking up the same point of view by the individual concerned as the one taken up by the group asking him; in order to do that, he has to achieve distance from himself, his thought has to exteriorize which can only be accomplished through some symbolic mode of representation that is missing in aphasics.*
> (Halbwachs, 1925, p. 103).

76

"Memories" and "frames" are not really separated in human memory (at this point he takes issue again with Bergson). The two are always intertwined, their only difference being related to the fact that one of them is more stable. Rationality itself originates in the group. As individuals, we hardly ever have mushy and uninterpreted experiences. This is due to social moments, however, and not to the integrating power of the individual mind. Were we ever be left on our own, we indeed would only have a buzzing-booming confusion. Rationality itself has its sources in direct social moments (as the influence of our group belongingness on recall) and in societal factors, like language. In the situation of recall, the group is present: we recall events according to our activated group membership.

Another part of the argumentation by Halbwachs analyzes memory in different groups rather than in the individual. We would characterize this effort today as an attempt to analyze the role of the practice of collective (joint) memory recall in the constant recreation of identity. On the basis of memory patterns in families, religious groups and social classes, he claims that in the process of tradition formation, the originally episodic memories become semantic ones and get decontextualized. Social frames, however, are never empty schemata for him. They entail "containers" and "contents" at the same time, concepts and images, and therefore have simultaneously a conceptual and a chronological organization. This multiple articulation of dualities gives relevance for Halbwachs in contemporary research in memory, as well as for studies of the relationships between memory and history that was the main topic of his later works (Halbwachs, 1941, 1950, 1992; Hutton, 1993).

Evaluation of Halbwachs

Halbwachs argues for a sociological determinism for individual mental phenomena. With his emphasis on the intentional moments, he opens up the way for constructive interpretations of the mind at large. There is a small but crucial difference between his views and the better known social constructivism of G. H. Mead, L. S. Vygotsky and others. While the latter ones base social determination on the notion of interaction, for Halbwachs, the impact and work of representations is crucial. Though he refers to the "presence of the group" in recall, he rarely gives an interactive interpretation for this effect.

There is a further aspect of Halbwachs worth emphasizing: the relationship between his theories and social conservatism at large. Duvignaud (1968), one of his (re)publishers, emphasized that socialization for Halbwachs is not deindividuation, rather, it is the domain of becoming human out of the status of "objecthood". The conception of collective memory was intended among other things to strengthen the group consciousness of the working class.

Kristóf Nyíri (1992), the Hungarian philosopher, presented Halbwachs as a representative of the traditional communal principles. On the basis of an assumed communally-based epistemology, Nyíri would even like to put Halbwachs into a line of conservative-traditionalistic European thought, together with people like Wittgenstein. The concept of collective memory did indeed serve an ideological function for

Halbwachs but along other lines. For him, the important moment was not a return to an assumed "original community". Halbwachs proposed his theory in a society with a broken sense of temporal continuity, in the France after the Great War. He wanted to point out the tradition of an alliance between critical rationalism and socialist working class movements, at a time when the French communists broke this traditional alliance. Namer (1994) points out that the notion of collective memory for Halbwachs was an important conceptual tool to point out the continuity of a non-communist left. It is not accidental that the most detailed treatment concerning the impact of groups on memory is the one dealing with social class in his work.

Nyíri points out, on the other hand, a rather basic issue: Halbwachs and all the French sociologism represented by him tended to ignore the radical differences between oral societies and societies organized around writing. Writing introduced new ways to think about abstraction (new ways for decontextualization) and also new ways for memory organization (Donald, 1991): an external field. In this way, I should add, a clearer differentiation appeared between the immediate social and the societal aspects regarding the impact of "others" on our mental life. The recognition of that fact should have an impact on the balanced treatment of the relationship between the effects of society and the immediate social group on mental life. This aspect makes the study of Halbwachs relevant for present-day discussions on the social determination of mental life.

7. TWO CONCEPTIONS ON THE CRISIS OF PSYCHOLOGY: VYGOTSKY AND BÜHLER

At the time of the rise and increasing influence of the great schools of psychology, several attempts were made to give a conceptual analysis of the divergent and divisive forces underlying the multiplicity of schools. It is Karl Bühler's (1927) analysis, *Die Krise der Psychologie,* which has become by far the best known of them, with its non-partisan attitude towards the schools coupled with a characteristic and very committed theoretical proposal for a way out of the crisis situation. Only very recently has a previously unpublished monograph, written with a similar aim by Vygotsky around the same time, become available. This 150-page essay entitled *The historical meaning of the crisis in Psychology* has appeared as the most substantial paper in the first volume of the Russian-language *Collected works of Vygotsky* series (Vygotsky, 1982).

The monograph, as the editors of the volume, Jaroshevsky and Gurgenidze (1982) duly note, presents Vygotsky as a metatheoretician of psychology *before* he has outlined his own instrumental, genetic-historic and systemic theory of the origin and nature of higher psychological functions. The work shows Vygotsky halfway through formulating his version of objective and Marxist psychology: already beyond the early stage where he described consciousness in functionalist terms as an internal reflection of reflections (or double representation), but before the integration of the core concepts of tools and of the interpsychic-intrapsychic developmental sequence in the formation of higher psychological functions.

As Jaroshevsky and Gurgenidze (1982) also point out, there are many interesting parallels between Vygotsky's views on science as a social institution presented in this monograph and his later views on the working of the individual mind. (Such a parallel between the theory of science and psychology is, of course, not unknown in the history of psychology; consider Bacon, Descartes or J. S. Mill among the classics.) The "systemic theory of scientific knowledge" is followed by a systemic theory of individual consciousness in which "…he has seen in the child a young researcher acting according to the same laws as the adult investigator". (Jaroshevsky and Gurgenidze, 1982, p. 456). Theory and empiria, concepts and words, practice as the moving force and criterion of knowledge, as well as other key concepts and issues familiar from Vygotsky's model of child development and psychology in general are first presented here within the context of a historical analysis of science making.

The present chapter has a rather limited aim: to introduce some of Vygotsky's ideas in the form of a comparison with those of Bühler, without the ambition to present their ideas in their entirety. Two philological comments are necessary before going into the comparison. Although in his later works Vygotsky does refer critically to Bühler's

Krise…, in this monograph there is no sign of it having been written with Bühler's parallel work in mind. The two other underrepresented names in the essay are those of Köhler and Piaget. Although Köhler is referred to several times (Piaget not at all), he is mainly treated as an exponent of the Gestalt theory, with no detailed comments on his ape research. This fact clearly shows what an important role the critical analysis of Köhler's research on problem solving in chimpanzees played in the formation of the "instrumental conception of psychology" in the later stage of Vygotsky's thinking. Similarly, the analogous fermentative role of Piaget in the development of the idea of inter-intrapsychic sequence is also apparent. In this earlier period, Vygotsky's work is dominated by critical conceptual analysis, and, while following this intellectual influence, critical analysis becomes a positive program, as *Thought and language* (1962) and *Mind in society* (1978) clearly indicate.

Some Parallels

An optimistic view of the crisis

Although both authors interpret the proliferation of schools as a symptom of crisis, neither of them consider it as being catastrophic for psychology, nor do they show a partisan optimism within the framework of one of the great schools. Bühler's optimism is aphoristically expressed in his characterization of the crisis as an *Aufbaukrise*, an *embarrass de richesse*. Vygotsky, in line with his Marxist methodology, is optimistic in a Hegelian sense: he is convinced that a new scientific psychology will emerge, preserving the past while at the same time abolishing it. For him, crisis is a symptom of the search for a new methodology and synthesis which is not available yet but which will arrive by necessity.

Methodology: Theory and data in science

The two authors agree that both the empirical and the rational are necessary poles of thought in psychology. (For an analysis of the metatheoretical views of Bühler see Kamp, 1984, and those of Vygotsky see Jaroshevsky and Gurgenidze, 1982). Vygotsky describes it as the necessary duality of induction and theory, and Bühler as induction and intuition. They diverge in the details, however. Bühler is moved by the idea of an axiomatic propaedeutical science, while Vygotsky, as shown by his criticism of similar ideas put forward by Binswanger (1922), believes in the continuity between different levels of generalization in science. However, in their own way, they both fight against the intuitionist ratiomorphic one-sidedness of *geisteswissenschaftlichen* (mental science) psychology and against the flat empiricism of some part of traditional "empirical psychology" and their behaviorist contemporaries.

Meaning ("sense") and the social aspects of mental life

There are also parallels in the positive programs the two authors propose, although in the case of Vygotsky, these are not yet articulated in the crisis monograph.

Both thought that in order to overcome the crisis constructively, one has to deal seriously with the problem of meaning or sense in psychology. Bühler, when he proposes language as a paradigm for the three irreducible aspects of psychology (experience, behavior and objectivation), claims that a dimension of meaning is necessary in the analysis of all forms of behavior in contrast to the Diltheyan approach, which would restrict the relevance of meaning to higher mental phenomena. Vygotsky (1934), as he puts it most clearly in his foreword to Koffka's book on mental development, emphasizes that language introduces a new dimension of sense going beyond the immediate givens of the perceptual field. This is almost the same statement Bühler (1934) made on this topic; their difference lies in the respective emphases. In his two-level theory of mental life, Vygotsky sees the difference between the "lower" and the "higher" meaning functions, while Bühler, fighting for the unity of psychology, places the emphasis on the presence of continuity here. The same holds for their treatment of the teleological aspects of behavior: for Vygotsky, the human teleology of work will become relevant, while for Bühler in similar form of behavior teleology is important in the fight against behaviorism.

Qualified similarities show up in their treatment of the *social dimension* in psychology as well. Both share the view that the social aspect of mental life is constitutive rather than merely restrictive in nature. As Bühler (1927, p. 38) puts it, clearly with regard to the problem of sense in language, "the origin of semantics should not be looked for in the individual but in the *community*". They also share the view (Vygotsky already in his 1925 paper on consciousness) that the social aspect is primary in the emergence of consciousness, or in Bühler's rather Meadian phrasing, signers and sign interpreters presuppose each other, and Ego and Alter emerge in a correlative way.

In his later work, however, social aspect for Vygotsky increasingly tends to mean society-dependent aspects, while Bühler keeps an *ethological interpretation* of "social" as the *communal aspect* in the more general sense.

Some characteristic differences

The basic dimensions of the crisis

Both authors agree that the multiplicity of schools should not be interpreted in a simply kaleidoscopic way. There must be basic dimensions behind the variety. For Bühler, the basic trends are classical associationistic psychology, the Würzburgian *Denkpsychologie*, and psychoanalysis. The latter two trends get rid of associationism by emphasizing hidden aspects of intentionality in thought or, as Pribram (1969) put it, both recognize that introspection does not directly reveal the mechanism of thought. Finally, behaviorism and mental science psychology in the way of Spranger (1926) are interpreted as attempts to overcome what Bühler calls the "solipsism" of psychology.

If one wanted to summarize Bühler's approach to basic dimensions, one could say that he has abstracted the following as the three basic parameters of the crisis: the problem of mechanistic explanation, the indirect study of hidden processes, and the subjectivity-objectivity issue.

Vygotsky, on the other hand, presents a picture which is richer but making his conception more economical at the same time. Let us first see where the differences lie! First of all, in his view, the problem of applied psychology is central to the crisis, while Bühler is much more "academic" in this respect. Secondly, Vygotsky gives a detailed analysis of the *overgeneralizing aspects* of the new schools. Bühler is also against the imperialism of the schools, but Vygotsky goes beyond this. Taking reflexology and psychoanalysis as "clinical cases", he shows that by becoming over-general, the ideas tend to explain nothing while they pretend to explain everything. In this process they gradually cease to be scientific concepts and become *Leitmotivs* of world views thereby entering the socially conditioned fight of world views.

Vygotsky's definition of the *basic parameters* of the crisis is simpler than that of Bühler. He defends the thesis (consonant with standard Marxist accounts of the history of philosophy) that the demarcation line is between idealistic-subjective and materialistic-objective trends in psychology, as well as in philosophy. Seemingly "third force" alternatives can always be traced back to one of these poles. The most interesting example of this is his analysis of Gestalt psychology which, in his view, due to the concept of psychophysical isomorphy, is actually a materialistic trend.

How can the crisis be overcome?

Bühler's famous solution, frequently called eclectic, is to take language as a paradigm for psychology and consider the three aspects of linguistic phenomena (experience, behavior and objectivation) as necessary conceptual dimensions in the analysis of simple behaviors as well. In all coordination there is sensation, its "semantic aspects" (reflection), and its role as regulator of behavior.

This so-called eclecticism is thus, as is well known, a kind of a semiotic theory for psychology, which tries to overcome the division of psychology into natural and mental sciences by treating all of psychology in terms of signs – man-made, language-like signs – as a demarcation line between man and animal, between natural and social, rather than as a common denominator (see on this Steiner and Souberman, 1978).

In his early monograph, Vygotsky does not specifically rely on the semiotic metaphor as yet: instead, he draws upon a more general remedy for psychology: practice. On the concrete level, applied psychology will be crucial in overcoming the divisive trends, since by necessity it has to talk about one model of man instead of two models, and that model will be a deterministic, materialistic one. On a more abstract level, for Vygotsky, this hope corresponds to the Marxist theory of truth: practice is the criterion for truth, and that is where Marxism provides for him the basic methodological help for the emerging new psychology (see Min Hak and Radzhihovsky, 1977).

The "crisis monographs" therefore show clearly the basic similarities between the two important synthesizers of psychology between the wars; while their basic divergences become especially clear in their later development. For Vygotsky, the semiotic metaphor later became a key to differentiating between higher and lower levels of mental life, while Bühler preserved the unifying conception of semiosis of which human language is surely a qualitatively higher form, without being separated from the lower forms as elaborated in Bühler's *Sprachtheorie.*

8. WAS WITTGENSTEIN A CONNECTIONIST, AFTER ALL?

The good old days: Rules in linguistics and in Wittgenstein

About half a century ago, linguistics underwent a rule-based conversion that seemed to last unquestioned forever. Some of the lasting new ideas, initiated by the early work of Noam Chomsky (Chomsky, 1957, 1965), were all centered around the concept of rules:

- a reliance on sentences and syntax as the central issue in understanding human language;
- the emphasize on rules in understanding language as opposed to simple patterns and habits;
- an individualized mentalistic view of language where grammar is interpreted as a mental property of the speakers of the language that is somehow unconsciously shared by them;
- a realistic as opposed to an instrumentalist view of grammar as a theory of language;
- and an innatist account for all of this that explicitly denies the role of habit formation and instruction in forming language.

Rules in this system in several respects were similar to the rules in some branches of linguistic philosophy. They were certainly supposed to be *constitutive rules,* as contrasted to *restrictive* ones in the sense of Black (1962). The naive reader may find a promising parallel between the way a traditional reified theory of language is replaced by a rule-based one in philosophy and the central role of rules in linguistics.

However, Chomsky himself clearly, although rather cursorily, contrasted his view on language and habits with the one proposed by Wittgenstein. Chomsky clearly puts him together with behaviorists, according to whom language is essentially an "adventitious construct" where conditioning *à la* Skinner and Quine (!) basically corresponds to drill in Wittgenstein (Chomsky, 1965, p. 55). The empiricist Wittgenstein is constantly treated by Chomsky (1971, pp. 17–18) as someone defending an instrumental view of language (Chomsky, 1964, p. 24). The only aspect where Chomsky has a favorable word for Wittgenstein concerns the idea that, following Wittgenstein, sometimes the obvious is the most difficult to explain (Chomsky, 1968, p. 22).

The basis for this dislike by Chomsky is surely to be found in a difference between a Cartesian and a social view of language. Fortunately, one does not have to speculate here. As it has been most clearly accepted and claimed by Fodor (1975, 1980) among the Chomskyans, according to them, the whole mind has to be understood in a solip-

sistic way. Mental states have to be interpreted in themselves, and in the same way, rules have to be interpreted just as properties of the isolated, self-contained system of the individual mind.

The anti-rule approach of the connectionists

The concept of rules as self-evident in linguistics was shaken in several respects during the last decade. Sociolinguists questioned the self-evident validity of rules over populations, while prototype theorists questioned the all-or-none nature of rule application. Also, within the generative movement itself, the technical role of rules has been replaced to a large part by constraints on generation. However, the most serious challenge that questions the entire concept of rules has come from a group which is a rival to all varieties of cognitive architecture relying on symbols and rules. The approach represented by this group, usually labelled as connectionism, is a radical neoassociationist way of thought (cf. Pléh, 1991). The key to the unity of cognition in this approach is not the language of logics, rules, and symbols, but the world of networks based on mere contiguity. The unity of cognition is provided by a theory of representation, where only facilitating and inhibiting connections exist between the nodes interpreted as abstract neurons. Knowledge is a mere activation of a partial network (McClelland, 1988).

This is supplemented by the fundamental idea of an overwhelming parallel processing (Feldman and Ballard, 1982) that is exposed most explicitly in the conception of Rumelhart and McClelland (1986; McClelland and Rumelhart, 1986).

This new ambitious project has generated several penetrating discussions (see the volumes edited by Pinker and Mehler, 1988, and by Pfeifer et al., 1989). One of the most important aspects discussed is the sincerely negative approach of connectionism to the issue of rules in mental life and language. Rumelhart and McClelland (1986, 1987; see also McClelland, 1988) are especially clear that they treat rules not as internal, inherent laws of the mental system but as external characterizations of the products of the mental system. The task, they claim, is to produce mechanical models that imitate, and thereby eliminate the level of rules from the proposed mechanism.

These proposals led to the unearthing of old animosities in linguistics and psycholinguistics (see the Pinker-Mehler, 1988 volume, and especially Fodor and Pylyshyn, 1988; Pinker and Prince, 1988) and to a restatement of what status rules have. Are rules inherent in the machines or are they present only in the mind of the designer, and – transplanting the machine model to man – are rules indeed in the human mind, or are they only to be found in the researcher's model about behavior?

Some of the criticisms of connectionist theory concentrate on the issue whether rule-governed behavior is reducible to simple connections and habit formation or not. Fodor and Pylyshyn (1988) in their criticism of connectionism, clearly spelled out that the basic limitation of connectionist models is their lack of rule-related structure. One can characterize this feature in several ways:

- Models based on patterns of (co)excitation cannot differentiate between two concepts being active simultaneously and them being in a given relation (like IS, PART OF, etc.).
- A connectionist representation has no clear syntax, which leads to a lack of logics.

The associationism of connectionist models situates the human mind at the mercy of the arbitrary unsystemacity of the world: it allows any connections whatsoever. It is the same issue that Max Wertheimer (1922) criticized concerning traditional psychology as the "mere existential relationships" responsible for association in classical associationism. No essential or meaningful relationship had to exist between the elements to be associated. It had to be replaced, he claimed, by meaningful and top-down organization in mental life. As Fodor and Pylyshyn put it today:

> *All it (i.e. the connectionist model) can do is build an internal model of redundancies in experience by altering the probabilities of transition among mental states.*
> (Fodor and Pylyshyn, 1988, pp. 49–50)

In order to account for the systemacity of mental phenomena, one has to go beyond this, to postulate structure-sensitive mental processes. The basic fault of connectionism would repeat the faults of all assocationism from the classical associationist accounts of the mind on: in order to reconstruct semantic coherence of thought, associations, being insensitive to structure, have a hard time. Why not give up their explanatory power and replace them with internal organization, or structure?

But where should this structure be found? Where are the rules in fact to be found?

The locus of rules issue: Are they in here, in the mind, or out there, in the social world ?

The connectionist challenge forces us to reconsider the issue that has been with us from the time of the criticism of private language by Wittgenstein (1958) and the whole Cartesian enterprise by Ryle (1949). The original appeal of the anti-Cartesian position seemed to be neat and easily interpretable from a social science point of view. Rules – sounded the rule-based argument – are real but they are the product of some social conventionalization. There is no thought in the proper sense without there being other minds and without a social communicative conditioning of our language use and mental world. (See a critical analysis of this view on Wittgenstein by Nyíri, 1989, 1992).

The connectionist challenge should make us conscious again that the issue is not simple and there still are basically three possibilities concerning the locus of rules and their relationship to our internal world.

(1) One option is that *there are no rules whatsoever,* at least internally. Our mind is entirely flexible and docile. Anything we do is just out of habit. Of course, habits can

be shaped by the external world. And whatever corresponds to an illusion of rules is in fact just a result of the conventional repetition of socializing constraints. There is no rational basis to rules beyond tradition.

In the contemporary way of talking, this would correspond to a radical one-level connectionist approach. When we learn a language, we only learn items and frequency features of those items that taken together create the illusion of rules (Rumelhart and McClelland, 1987; McClelland, 1988). It would, however, also correspond to an exclusively traditionalist, conventionalist reading of Wittgenstein. Well before connectionist times, Chomsky (1980, pp. 49–50) pointed out this when he claimed that when Wittgenstein rejects a theory of mental structure, "[W]e are left with a descriptive study of behavior, potential behavior, dispositions to behave" (p. 50). Our language behavior would be the mere result of conventions. As pointed out by Nyíri (1992, pp. 105–113), this might only be true of traditional oral cultures. In this paper, Nyíri claims that in literate societies, there is some cognitive autonomy and room for private language. This is of course far from Fodor's (1975) universal language of thought, but at least one step between the two groups.

In my view, one could see a strong parallel between a radical network theorist and a radical conservative interpretation of Wittgenstein. Interestingly enough, the rare works that talk both about Wittgenstein's implications for cognitive science and about connectionism do not analyze this possible relationship. Leiber (1991, pp. 82–84) gives a computational interpretation of Wittgenstein, where automatic computation would correspond to rule obeying behavior, but does not relate this view with the picture he gives of the connectionists.

(2) The other option is that *rules are inherent to our mind*. You can be as radical here as Chomskyans, like Fodor (1985; Fodor and Phylyshyn, 1988), who seems to suggest that there is nothing to language but rules (or constraints in a newer terminology). Some provide compromises like Lachter and Bever (1988), who alongside with rules, provide for an enormous amount of elementary habits. Connectionism can be claimed to be a description of that (lower) level of behavior. But habits never become rules, and the associationistic account should be reserved for habits. In a similar way, Pinker (1991), on the basis of extensive empirical studies of regular and irregular morphology (frequency judgements, perception, production in normal and grammatically compromised populations), claims that there are two systems behind language. One is a rule-based system while the other is a habit-based system of learned exceptions that computes rather like a connectionist associative system.

Notice that in this rather plausible dualist system, whatever would be rule-based in a radical traditionalist sense becomes the opposite of rules. Rules proper are entirely different from mere traditions, habits, usages. They have a speculative-rational basis, while habits are not rational for the individual mind (though may have a rational historical reconstruction).

(3) The third way is *to treat rules in a non-solipsist and at the same time non-arbitrary social way*. This is the least specified option. Some remarks made by the connectionists themselves open room for speculation here. Rumelhart, when he tries to

account for logics and thinking, comes to rely basically on the environment, especially the environment as manipulated by humans. Specifically, they claim that logical organization is not a property of the human mind in itself (Rumelhart, Smolensky, McClelland and Hinton, 1986, p. 44). The logical outlook comes from a combination of three factors: fast pattern-matching capacity, good predictive modeling of the environment, and perception of the result of our own manipulations on the environment. On the final analysis, they also admit that this latter feature results in a circle where our behavior impacts on the system in a form like inner speech. They explicitly refer to Vygotsky (1962) as an inspiration for this cultural view of thought. If we allow for some elaboration here, this proposal suggests that the individual mind or networks are not rational as such, they are becoming rational by the fact that a rationally organized habit system is implemented in them by social rules. Similar ideas are proposed by Smolensky (1988), when he postulates a subsymbolic and a symbolic system for cognition and continues by claiming that cultural knowledge is represented in a transparent, rule-like way in the mind, while intuitive knowledge in a non-transparent way that in itself does not look like a rule at all. This twofoldness would correspond to a non-radical reading of Wittgenstein as well.

But two issues remain to be resolved, even under this third approach. What guarantees the validity of a rational organization with universal principles and logics, etc. coming from the social world? There are a few social theories of knowledge that allow for that, i.e., for a non-arbitrary social determination. Piaget (1965), in his constructionist view of social determination, offers a proposal. According to his position, the coherence of thought can come from two sources. It is either based on mere authority, constraint and tradition (on mechanical solidarity in the sense of Durkheim). This would correspond – if we are allowed to modernize Piaget – to a strictly one-level connectionist network model of thought, without the ideal of rationality, and to an entirely conservative reading of Wittgenstein. There is a conformity to the social constraints that form our habits, without weighing and rational consideration. Rationality is the ideal of another type of coherence that corresponds to organic solidarity in the sense of Durkheim and to cooperation and social shaping where argument and comparing the individual positions against each other is the central point. Logic and modern rationality would come out of non-authority-based social organization. Democracy goes together with rational organization and the claims for argumented universality.

This image would then correspond to claims that there are two levels of organization that may coexist in our individual minds. One corresponds to unquestioned social shaping and single-level networks, while the other to relational mentality based on social arguments and implying a level of mental representation corresponding to truth and rules.

As appealing as this view seems to be, it has a basic shortcoming. It may suggest interesting solutions to the nature of social rules of conduct and logics proper but it is not clear how it could be applied to language in general. Rules and games of language certainly precede logical organization, both in the life of our species and in our individual lives. Language rules would still imply a need for a former, "solipsistic", innate basis: a rule-governed organization of one aspect of our mental life that would not presuppose social interaction, and would not take its features from social life.

I have no answer to the provocative question in the title of this chapter. Take it as a game: as an invitation to rethink some of the Wittgenstein interpretations. I do seriously think that for many of us, one of the most challenging "philosophical" problems both in the sciences and the humanities is how to base rationality and logic on a system that inherently has no logical organization. There have been several easy attempts to do that. Some of the most remarkable ones merely claim a correspondence between individual thought and logic to begin with. Fodor (1985) claims a parallelism between logical argumentation and the "train of thought" because there is an *a priori* language like nature to human thought (Fodor, 1985).

The connectionist challenge is certainly rather strong. As Ramsey, Stich and Garon (1991) clearly argued, a strong kind of connectionism in unreconcilable with any propositional type of mental representation (and therefore with a traditional, logically organized view of knowledge). The task for Wittgenstein interpreters in this situation is to show which one of the rule concepts inherent in Wittgenstein should be used. Should he be really called a proto-connectionist or not?

THE STRUCTURE OF MIND:
HISTORICAL EXCURSIONS

9. THE RENAISSANCE OF ASSOCIATION IN CONTEMPORARY COGNITIVE PSYCHOLOGY: THE CYCLIC FATE OF ASSOCIATIONISM IN PSYCHOLOGY*

Not only books but concepts as well have their own fate. Association as an explanatory concept with positive connotations had a long way to go before it achieved its status in the theoretical and the emerging new experimental psychology of the late nineteenth century. As Dezső-David Rapaport (1939), a graduate of the University of Budapest, then called Pázmány, now called Eötvös, who later on became famous as an American psychoanalyst, first clearly pointed out, the victory of association has taken a few hundred years in modern European thought. Associations were first treated as representing the elements of "mushiness" in human thought. They were the reasons for *ad hoc*, contingent connections as opposed to real ratiomorph knowledge. Associations were opposed to reason as existential elements to essential ones. At the end of a several hundred years' long process of gradual shifting away from performed structure towards parsimony in explaining cognitive phenomena, however, associations became explanatory concepts especially in British empiricism. Rather than representing the accidental moments, associations turned out to be the tools to explain supposedly higher organizations. At the beginning, association was inferior to structure, and at the end it became the source of structure. **Table 9.1.** summarizes this epistemological change in the relative status of the concept of association and that of reason and logic.

Table 9.1. Changes in the relationship between association and structure in the birth of modern empiricism

Beginnings (early 17th century)		End (late 19th century)
Accidental, misleading Wrong, to be overcome by reason	ASSOCIATION	Basic, explanatory, positive building block
Real inherent relations; help to overcome the limitation of associations	LOGICAL STRUCTURE OF REASON	Has no separate existence; structure is reducible to associations

---

* Based on a paper read at the second Italian–Hungarian meeting of Psychologists (Budapest, September 1989).

The Gestalt school was very clearly critical of the explanatory power of associations (Wertheimer, 1922), as were the early schema-theories like the one proposed by Frederic Bartlett (1932). The general belief in the explanatory power of the association concept has been with us in mainstream experimental psychology up to the late 1950s. In this respect, all developments in neobehavioristic learning theory could be interpreted as elaborations on this theme: elaborations of the explanatory power of associations.

The questionable status of associations in early cognitive psychology

In a way, the entire birth of cognitivism could be looked upon as a refutal of the association principle of explanation. The most clear-cut exposition of this new move with most consequences was presented in the rejection of the associative model of language in the early expositions of the generative grammar proposed by Chomsky. In the *Syntactic Structures* (Chomsky, 1957), this criticism was articulated as a rejection of both deterministic and probabilistic left-to-right (Markov-chain) models of syntactic structure. Later on, in his papers written together with George Miller (e.g., Miller and Chomsky, 1963), it took the form of a more general rejection of any elementaristic proposal even for the explanation of language use. Structure (most notably formal syntactic structure) was presented as an inevitable higher-order, globalistic component of the representation of language in a framework alluding to Lashley's (1951) famous analysis of the impossibility of serial reflex-chain models to deal with rapid sequential organization in behavior (Chomsky, 1968).

Later on, Chomsky's followers, Bever, Fodor, and Garrett (1968) presented a more general claim in a famous short note. They unearthed a principle they called the *Terminal Metapostulate* of associationism. The informal essence of this principle is that "associative principles are defined as over the vocabulary in which behavior is described" (Bever, Fodor and Garrett, 1968, p. 583). Therefore any internal connection (association) is to be a description of a potential piece of actual behavior. However, it is easily proved (e.g., in language) that there are many "abstract" connections formed, connections between categories that never appear in actual behavior.

About the same time this radical criticism was taking form, associations over the terminal vocabulary (i.e., actual behavior) were replaced in the learning theory camp itself by the concept of *mediated* learning. Connections were supposed to be made between and with the help of unobservable entities like images, mediating verbal connections like sentences and so on. Association and associative learning has gradually become a phenomenon that was to be explained by other, hidden mechanisms. Organization has become the key concept instead of association. Later, the emergence of *schema-based* conceptions of learning and organization with concepts like frames (Minsky, 1975), *schemata* (Rumelhart, 1980), and *scripts* (Schank and Abelson, 1977) have even more seriously questioned the power of associations as explanatory principles. All interesting mental organization started to be treated as resulting from higher

order information packages. Understanding, for example, rather than being an issue of operations over strings was more and more supposed to be a top-down process of filling the empty slots of prepackaged "wholes".

For a while, it seemed to be that association as an explanatory principle is gone for ever. The phenomenon is still with us, of course, but it can be reduced to structure, rather than the other way round. Even in the mid 1970s, the two approaches to eliminate association as a "primitive concept" had a radically different flavor. The concrete applications of the *linguistic framework* clearly proposed a reduction of the existential and accidental nature of association to more basic (innate, as supposed by some people) linguistic structure. Herbert Clark (1970) for example designed a well-received analysis of some classical verbal association phenomena. Essentially, he suggested that syntagmatic and paradigmatic associations* should be interpreted as results of feature manipulations over the lexicon. A pair like *dog – animal* is to be seen as a result of feature deletion, while *animal – dog* as a result of feature addition; some syntagmatic pairs as realizations of contextual features like selectional restrictions and so on.

On the other hand, the schema-oriented view could well be interpreted as a *cognitive counterrevolution*. Associations were questioned in this framework as well. They were replaced by higher-order structures. However, these latter ones on their turn were interpreted as the results of perceptual learning: encodings of frequent co-occurences in the environment. Thus, schemata were not elementaristic on the level of organization but existential and accidental in their origin.

Elementaristic counterrevolution

The rebirth of associationism was a rather gradual process at first. In the beginning, taking into account the linguistic criticism, a rather delicate type of associationism was proposed in the famous work of Anderson and Bower (1973). In their model of *Human Associative Memory*, associations became structured. Although the basic organizing principle for human thought was association, it became "syntacticized" and formalized. Associations were *labeled*; they were carrying different relational informations concerning the content of relations between the two terminal elements. And, as a matter of fact, this very labeling has forced all elements into the framework of a sentential grammar *à la Chomsky,* by providing a scaffolding like CONTEXT–SUBJECT–PREDICATE. In the less principled different proposals for the structure of semantic memory in the early seventies, the same tendency could be observed. People like Collins and Quilian (1968), Norman, Rumelhart et al. (1975), Kintsch (1974), and others have all presented labeled graphs for the structure of cognitive representation. Relations between cognitive units were basically associative. The arrows connecting nodes represented the elementaristic structure, while the labeling (think of the case-grammar-like categories proposed by Kintsch as AGENT, INSTRUMENT etc.) configurational characterization of

---

* Note that the original introduction of this pair of concepts into the learning theory framework in the mid 1950s by Palermo and Jenkins in the program book published by Osgood and Sebeok (1954) had already indicated an opening to linguistic intervention.

arrows (like subordination or predication) represented the more qualitative engagements of the neo-associationist trend.

However, the real breakthrough and revitalization of association has come under a more radical form. The *connectionist model* of information processing that has taken form from the mid-seventies on, proved to be more radical than the previous network models since it tried to reduce all representation to one unitary form. As presented by Rumelhart and McClelland, this approach also carries the features of a network model. However, if a distant historical analogy is allowed here, the secondary associative laws *à la* Thomas Brown (1790) allowed in the previous labeled network models have given place to an integral *mental mechanics* in the style of the mental mechanics of James Mill (1829), not allowing anything but a single type of connection.

Following McClelland (1988), their model has the following basic features that are of interest to us here:

- The model consists of *units* and their *connections*. Units take the weighed sum of activation coming from their environments. Connections are positively and negatively weighted "wirings" between units.
- *Different networks are postulated for different tasks.* One of their basic features, however, is the massive parallel and interactive organization. E.g., in the process of recognizing visually presented words, the unit corresponding to initial T facilitates all the units at the word level beginning with T, and these units, on their turn, facilitate the perception of letter T (its corresponding unit), and inhibit units representing other letters.
- "*Representations* in connectionist models are patterns of activation over the units in the network" (McClelland, 1988, p. 109). The representations are active in the sense that there is no need for a further central processor to spread over activation: an active island is an ocean of organized units that automatically spreads over the activation to other areas.
- *Processing* is the unfolding of activation over time.
- Learning is the modification in the strengths of connections. Both occur according to specified functions of weighing. The details of this process are subject to much debate in the connectionist camp. (See the McClelland–Rumelhart and Rumelhart––McClelland volumes of 1986, for an illustration of the debates over learning mechanisms and so on.)
- Knowledge is represented in the pattern of connections. There is nothing but connections to represent whatever knowledge we have of the world.

If we want to interpret this model in the light of the relationships between structure and association, the basic connectionist models all believe that structure should be reduced to association or connection formation.

Rules or connections: Some basic criticism of connectionist models

The most interesting criticisms of connectionist theory all concentrate on the issue of structure vs. elements. On the contemporary scene, this takes the form of discussions whether there are rule-governed behaviors not reducible to simple connections or habit formation. The generativist structuralist critics point out that the traditional rejection of associative and stochastic principles for the explanation of language is still valid concerning the neo-connectionist models, and that they are unable to deal with rule-like regularities in a clear way.

Table 9.2. The juxtaposition of connectionist and classical cognitive architecture according to Fodor and Pylyshyn

Connectionists	Classical view
Nodes	Descriptions
Only causal relations (history of excitation)	Rich relationships (language of thought)
Excitation paths structure	Rewriting rules
Independent units	Structure-dependent entities (constituents)

Fodor and Pylyshyn in their critique of connectionism clearly show that the basic limitation of connectionist models is their lack of structure.

One can characterize this feature in many ways: "Models based on patterns of (co)excitation cannot differentiate between two concepts being active simultaneously and them being in a given relation (like IS, PART OF, etc.)." As we have seen, this was attempted to be solved by labeling the graphs in "classical" network models.

A connectionist representation has no clear syntax (lack of structure).

The associationism of connectivist models situates the human mind at the mercy of the arbitrary unsystematicity of the world: it allows any connections whatsoever. It is worth to remember that Max Wertheimer (1922) in one of his theoretical papers on Gestalt psychology has also criticized what he called the "mere existential relationships" responsible for association in classical associationism. No essential or meaningful relationship had to exist between the elements associated. He proposed that this was only true in extreme situations, in certain limited cases and so on. On the whole, it had to be replaced by meaningful and top-down organization in mental life. As Fodor and Phylyshyn put it: "All it (i.e., the connectionist model) can do, is build an internal model of redundancies in experience by altering the probabilities of transition among mental states" (Fodor and Pylyshyn, 1988, pp. 49–50).

In order to account for the systematicity of mental phenomena, one has to postulate structure-sensitive mental processes. The basic flow of connectionism is parallel to the flow of all associationism from the classical associationist accounts of the mind

through Hull (1943) to Hebb (1949) and Osgood (1963): in order to reconstruct seman-tic coherence of thought, associations, being insensitive to structure, have a hard time. Why not give up their explanatory power and replace them with internal organization or structure?

In a more permissive formulation, Lachter and Bever (1988) also conclude that con-nectionist accounts are associative in nature. However, being parallel and allowing for associations at different levels, they provide for an enormous amount of elementary habits. But habits never become rules. However, "[i]t is equally obvious that some behaviors are habits" (Lachter and Bever, 1988, pp. 243–244). Connectionism can be claimed to be a description of that (lower) level of behavior. Habits and rules should still be differentiated, as it was proposed a good 30 years ago by Chomsky (1959), and the associationistic account should be reserved for habits.

The hidden associationism of the structuralist movement

At the same time however, when they produce their sharp criticism of the connection-ist models, some of the very same authors also allow the concept of association as an explanatory principle through the back door. Specifically, in the *modularist* explana-tion of language understanding, as proposed by Fodor (1983), association reemerges as a tool to avoid interactions between different levels of processing during understand-ing. The mental lexicon that is a modular component of understanding does in fact carry the burden of associative real world knowledge.

There has been an ungoing controversy for about half a century on how to treat the effect of the knowledge of the world, pragmatic factors, schema-like macropackages of information and similar factors on language understanding. Three basic extreme approaches took shape with many important finer varieties. According to the entirely cognitivist-semanticist framework, knowledge of the world and pragmatic factors are the driving force in language understanding. In processing an irreversible sentence like (1) there is no need to consider structure and syntax at all: bones do not eat as yet dogs, while in our real world of all the possible worlds, girls do chase boys as well as the other way around. Thus, understanding of (2) is slower and more difficult because here the structure (note the passive) somehow has to be taken into account.

(1) The bone is chewed by the dog.
(2) The girl is chased by the boy.

According to the ordered componential account represented by people like Ken Forster (1979), where the components and their arrangement basically repeat the components of grammar, all analysis is autonomous and the ordering of components is strictly reg-ulated. Thus, phonetic analysis always precedes word recognition, this one precedes syntactic analysis, which is followed in its turn by the consideration of semantic struc-ture (message processor). World knowledge as a factor of the *General Problem Solver* component of understanding comes into the picture only at the very end. According to this account, data on the role of cognitive factors on more "elementary" levels of

understanding only mirror the *post hoc* influence of these factors. The third approach, most clearly represented by Marslen-Wilson and Tyler (1980) is the interactionist one. According to this approach, the human understander is an opportunist: it engages at several levels of processing in a parallel manner and uses all top-down and bottom-up information simultaneously, in an opportunistic way. The computation that first arrives to an acceptable solution wins and blocks the others as redundant.

The debate has become connected to the issue of associations in connection with the analysis of ambiguities and lexical processing. How do we compute ambiguous items in contexts? And how should we treat the evident lexical facilitations observed in priming paradigms? The approach taken by Fodor (1983) is part of his more general *modular conception* of the workings of the human mind. According to this view, all interesting parts of cognition are the results of the working of independent and cognitively impenetrable modules, information processing little machines that take a given input and do their processing in a fast and automatic way. Only their output can be influenced by cognitive factors from other modules. Concerning language understanding, this much debated approach suggests that in the case of ambiguities like (3), both meanings of the word *bank* are computed and context only allows for a fast post-lexical selection of the relevant alternative.

(3) John went to cash his check. The bank was empty.

The issue of who is right in the ongoing debate could be ignored for our purposes. What is important in the present context is the following. There are certainly many lexical interactions between the recognition of words in continuous text. Fodor tries to account for this by enriching the lexical component in the modular model he proposes for understanding. The fact that the perception of the word *check* has an influence on the recognition of *bank* would be accounted for by preexisting associations within the lexicon. The lexicon itself is a *network* that facilitates processing. It does so, however, without recourse to meaning: the *check – bank* association would facilitate the access of the entry *bank* – including the availability of the irrelevant meaning.

In this way, the lexical component of understanding becomes extremely rich. This lexical component would represent all "higher order" information proposed by the interactionists. The model achieves this goal by replacing schemata and knowledge with associations between individual lexical items. The arrows in the network, however, do not carry semantic information in the traditional sense. Association here again becomes accidental and experience-driven in the same way as in the connectionist networks. Structure is preserved certainly on other levels, but Fodor has to allow for disorganized, probabilistic, habit-like influences exactly at crucial points in his model.

Replacing cyclicity with dual organization

Besides pointing out the surprising centrality of the concept of association in two rivaling schools of contemporary cognitive psychology, what kind of a moral could we point out? It seems to be that the cyclicity of reducing structure to association and elim-

inating associations through structure is still with us. However, a detailed conceptual analysis of the two trends indicates that this straightforward and narrow-scoped opposition has to be overcome.

On the one hand, the critical analysis of the connectionist approach, as presented e.g., by Pinker and Prince (1988) for the supposed simulation of the learning of the regularities of the English past tense, proposed by Rumelhart and McClelland (1987), indicated that the connectionist model is not sufficient for the elimination and reduction of rules. At its best, it could be interpreted as an implementation level system for representing rules existing at another level. Thus, on the one hand, structures and rules do not seem to be amenable for elimination even at the most sophisticated contemporary level of elementaristic reductionism. On the other hand, it seems that even approaches that are strongly committed to the overwhelming importance of structure and rules cannot ignore pattern induction and frequency-based elementaristic factors in so-called "high human" cognitive processes like language.

It seems that rather than trapping ourselves into either-or models of the human mind, we should be better off by allowing both types of organization. By considering both simple experience-bound and frequency-based networks as well as structural, constituent organized processes (call it the language of thought or as you like it) we are back at the duality of human information processing: *association and structure or logic should both be used in the modeling of higher-order processes.*

All of this of course is not meant to be an attempt to solve all the issues raised by the two approaches. It merely suggests a need for a shift towards a broader and more tolerant attitude. The issue of parallel versus serial processing; modular, qualitatively specialized or unitary organization; analogue and binary structure and so on are far beyond the ambitions of this modest exposition.

10. THOUGHTS ON THE DISTRIBUTION
OF THOUGHTS: MEMES OR EPIDEMIES*

> *We are victims of an illusion that makes us believe that we have created what actually grasps our volition from without.*
> (Durkheim, 1895/1982, p. 13)

This chapter starts from a general consideration of three programs in cognitive science: the internalist, the externalist, and the social approaches to cognition. In the social domain, some new approaches propose that human sociality is to be treated as part of our biological nature. Several research programs were born out of these considerations. There are some among them that propose general theories for the distribution of representations. The chapter analyses two of these, the meme theory put forward by Richard Dawkins, and the epidemiological theory proposed by Dan Sperber. It points out that while for Dawkins the essential aspect is replication, for Sperber it is representation transmission where biological analogies become crucial. For both theories, to make them working models, a lot of detailed elaboration is needed from data of social science.

Three programs for cognitive science

Contemporary cognitive science has several alternative general research programs that interpret representations from different perspectives. A possible scheme for this classification is given in **Table 10.1.**

The internal horizontal approaches study *relations among representations*. Several traditional disciplines belong here, like logic, and even experimental psychology, since it deals with internal relations between thought processes. Among the philosophical views of present-day cognitive science, this approach is represented by the Language of Thought conception of Jerry Fodor (1975, 1990). In this view, a postulated Syntactic Theory of Mind is responsible for a comprehensive internal mental organization, with implicational relations between representations. Recently, both the purely logical and the purely psychological attitudes started to allow for a vertical biological interpretation of these regularities of thought processes, in the emerging field of cognitive neuroscience.

Table 10.1. Different frameworks for cognitive science

A. Internal horizontal view – logic, psychology	Internal views
B. Internal vertical view – cognitive neuroscience, psychophysiology	
C. External horizontal view – external semantics	External Views
D. External vertical view – social semantics	

An *external semantics* supplements this view. According to this attitude, the human mind considered as a symbol-processing system is grounded in the real world due to perceptual processes. As Steven Harnad (1990, 1996) proposes, human cognition has two layers: the symbols working by establishing relations between themselves need to have a perceptual grounding in the real world. However, a third attitude regarding representations is emerging that is referred to in **Table 10.1** as the External Horizontal view. Its basic concern is not how representations are tied to the physical world, but rather what the relationship is between representations entertained by individual knowing subjects. The first problem is a structural one: how similar are these representations to each other? The second issue is a genetic one: how does the harmonization of representation systems come along? A simple solution is offered by biological universalism: structural similarities are explained by biological uniformities. According to the program of *social cognitive science,* on the other hand*,* the key issue is the mutual impact between systems of representations. This is the natural domain of traditional learning theory and sociology as well. My intention is to survey and compare two comprehensive theories of "social cognitive science" that both offer a new framework for the traditional issue of "the harmonization of representations".

Representations in cognitive science and in social science

Thus, the three approaches to cognitive science differ from each other in concentrating on different aspects of representations. The social framework for representations in cognitive science can be interpreted amongst the more traditional issues of the history of European thought. These traditional issues are:

– what provides for harmony between representations and, therefore, for the preservation of tradition;
– what provides for innovation in the domain of representations, how new ideas, i.e., new representations come along at all;
– and how the distribution of ideas and innovation is influenced by social structure.

Any self-satisfied social scientist would reply to this that these are core issues of classical social science. Traditional historical linguistics, for example, deals with the distribution and change of principles of language structure during the interaction between languages, or with issues like how certain words become popular. A classic question

of sociology, on the other end, is the regulation of the distribution of ideas by reference groups and opinion leaders, including social psychological theories about the impact of schemata and stereotypes on information processing. These aims are still with us today.

The theories entertained by cognitive science and evolutionary theory have a more unifying vision. They are interested in issues like what makes it possible at all to have agreements between representations in a species characterized by competitions involving hierarchy on the social level, and cooperation entailing mental concordance. From an evolutionary point of view, the human species has representations with a rather peculiar status which are parallel to the different models of cognitive science. As Sperber (1997) presents it in his claims for a strongly individualistic cognitively-based social science, it is in fact the sharing of representation that is making the crucial connection between individual minds. To put it in a more analytic manner:

(1) Humans are hosts to representations, being constructors and carriers of intentional representation systems that are tied to the external world.
(2) Representations are also tied to social communicative systems.
(3) They have a social intentionality: humans presuppose that their communicative partners are also carriers of representations.

Traditionally, the first aspect was referred to as thought, the second as linguistic thinking, and the third as being a social animal. Present-day cognitive science treats the issue of representations as tied to communicative systems, or even cultures (Donald, 1991, 1993, 2001), and social intentionality (Tomasello, 1999, Gergely, Nádasdy, Csibra and Bíró, 1995) as being crucial to the human mind. Being a creator and a carrier of representations with a social orientation would be a characteristic biological feature of humans, making them good psychologists (Humphrey, 1976).

Michael Tomasello (1999; Tomasello, Kruger, and Ratner, 1993) proposed a theoretical synthesis emphasizing that biological conditions are the preconditions for culture. Tomasello stresses that simpler social organizations of primate life turn into a biologically interpreted cultural system through the actions of a guiding principle. This cardinal change means that humans are not merely social interactors but they take the intentional stance in the sense of Dennett (1987). Due to this change, facilitation turns into teaching, gaze following becomes shared attention, and so on. This is in line with the threefold determination mentioned above: humans are representational beings characterized by shared, or distributed knowledge, who presume the same principles to hold in others, too.

Social coherence as an issue of harmonizing representations

Three visions on the relationships of individual and social representations

Coherence between representations was interpreted in different ways in modern European traditions about the relations between individuals and society as presented in **Table 10.2.**

Table 10.2. Three possible views on the relations between individuals and society

View	Role of individual	Role of society	Kind of relationship	Characteristic authors
Individualism	Unbound	Constraining	Selectionist	Descartes, Locke
Standard Social Science	Bound	Constructive, source of values	Instructionist	Durkheim, behaviorism
Social Individualism	Becomes unbound	Grounded in primary social	Mutual sociality	Bowlby, Piaget, Gergely

The first row of **Table 10.2.** summarizes the individualism of European thought, criticized by so many authors during the 20th century. Rationalists and empiricists shared the belief that

– there is something to be called eternal human nature;
– this can be studied on the individual level;
– society with its practice and superstitions distorts original human nature and in fact impedes its discovery.

In the liberating Enlightenment varieties of this belief in human nature, universal cognitive powers are natural allies to some primary motivating systems in providing a solid foundation for natural law. Starting from this conceptual platform, the approach led a constant campaign against mystical certainties and oppressive moralizing traditions.

The issue Enlightenment was facing in this regard could be characterized in present-day terminology as the issue whether society uses an instructionist or selectionist control over individual representations. Gary Cziko (1995) phrases this dilemma as valid for all sorts of changes in knowledge. What are the possible sources of these changes? Cziko differentiates three views. In *providential views,* ready-made knowledge comes from omniscient external sources. In *instructionist views,* new knowledge is built up in a stepwise manner from outside resources, like in traditional scholastic instruction. Finally, in *selectionist models,* the sources for new knowledge are to be found within the system itself, and external agents, such as schools, society, social environment only select from the possibilities generated internally. Regarding representations, these three versions roughly correspond to radical nativism, standard social science with its implicit radical empiricism, and different varieties of epigenetic selectionist models.

Tooby and Cosmides (1992), as well as Pinker (1997) apply a similar rough caricature to underlie the dominant views that formed the negative counterimage for an evolutionary vision on society. A Standard Social Science Model (SSSM) took shape in early twentieth century, in fact as a reaction against a presumed "shallow evolutionism". Connecting evolutionary ideas with special studies was one of the ideas of positivist social science. Individual cultures, languages, and human varieties on the large were interpreted as developmental steps in the shaping of humanity. Richards (1987) gives a very thorough survey of this classical Darwinism in social science, highlighting the varied political commitments of the different actors. Across the board, this first

Darwinian attitude carried the unfortunate social overtone that there are primitive cultures and languages, contrasted to developed modern ones. Modern social science took off from questioning this attitude. The emphasis on the equality of cultures and languages from Franz Boas on was overextended towards questioning any use of evolutionary theory applied to human society. This resulted in three features summarized by Pinker (1997) that are of interest to us:

– The human mind became interpreted as an unbound general purpose learning machine with no (biological) constraints.
– Cultures can differ radically from each other.
– These cultural differences and varieties shape the formation of individual mental architecture.

This traditional SSSM view treats humans as entirely flexible beings, with a relativistic praise of the power of cultures. This approach had a variety that emphasized the role of interactions in implementing this cultural determination, from James Mark Baldwin through Georg Herbert Mead, Henri Wallon, Lev Semjonovich Vygotsky up to Michael Tomasello as of today. In this version, knowledge would be interpreted as inherently social, but it would become an integral part of the individual mind, not through some unidentified process of social instruction, but rather through interactions with others.

Line 3 in **Table 10.2.** alludes to the new approaches that assign sociality to the individual mind and try to elaborate a theory of primary sociality that would not be at the same time instructionist in the sense of Cziko (1995). These attempts usually rely on the analysis of primary attachment processes, the formation of a Theory of Mind, and the unfolding of intentional attribution. This is in line with the proposal of Humphrey (1976) that social pressures were the basic factors in developing the human mental architecture. (For some surveys see Tomasello, 1999, Cummins and Allen, 1998; Gergely, 2003.) They all entertain a set of commitments towards the following.

– Humans are by necessity social beings, society itself being merely a modulation or a derived feature out of this primary sociality.
– The roots of this sociality have to be looked for in individuals.
– One can talk about emergent interactionism of a sort in this sense.

Two rival contemporary models on the distribution of representations

What I referred to earlier as social cognitive science has three basic varieties. The leading and most interesting one is the genetic-structural view that tries to show elementary sociality in the unfolding of the mentality in human children (e.g., Tomasello, 1999; Gergely, 2003). Another program is paleo-cognitive social reconstruction. Donald (1991, 2001) and Mithen (1996), among others, suggest that in the formation of human mental architecture social changes, like the appearance of social semantics

in language or the development of social imitation, played a crucial role. Finally, the third approach to social cognitive science tries to combine evolutionary ideas and models of how individual representations are distributed in a community.

In contrast to the other two social evolutionary models, the ones dealing with the distribution of representations are not interested in the genesis of human mental architecture. Rather, they concentrate on token elements of cognition, and claim that independently of their content, they have an underlying social fabrication. Their basic research issue is social cohesion as it is implemented in the *distribution of representations*. There are two rival models in this domain. The better known is the infamous memetic theory of Dawkins (1976, 1982, 1995), the other one is the epidemiology of representations claim made by Dan Sperber (1984, 1987, 1994, 1996). They have some underlying common features that help us to portray them on the paletta of cognitive science and social sciences as well.

– They both emphasize the repetitive elements of human thought.
– Their key problem is the spreading of representations.
– They both rely on biological metaphors in interpreting social phenomena.

The last element is really a sign of changing times. Many decades ago, the radical followers of Durkheim, the French sociologist school of psychology, claimed similar ideas about the external shaping of our mental content. For them, however, the social scaffolding was genuinely, purely social (Halbwachs, 1925; Blondel, 1928; about them see Pléh, 2000), while for the new varieties, the sociality of all of our thought is based on biological models, or at least metaphors. The use of biological metaphors is crucial, since while they concentrate on repetition and similarity in representations, they do not fit into classical sociologistic modes of thought. Their basic mental template is not social control over representations, but rather an inverted logic. The very societal level of organization came to exist in their interpretation through the workings of conservative mechanisms of distribution of representations. This essentially conservative mechanism that would assure social integration is interpreted to be part of human biological nature.

The memetic theory

The meme theory, as proposed by Dawkins, treats memes as units of *cultural replication*. According to the simple definition given by Dawkins, a meme is "a unit of cultural transmission, or a unit of *imitation*" (Dawkins, 1976, p. 206). Memes have their own tendencies to replicate ("a cultural trait may have evolved in the way it has simply because it is *advantageous to itself*", ibid, p. 214), but they basically survive if they increase our cultural fitness. As Wilkins (1998, p. 8) put it as a summary statement about memes as being replicators and also being subject to selection:

> *[A] meme is the least unit of sociocultural information relative to a selection process that has favorable or unfavorable selection bias that exceeds its endogenous tendency to change.*

Many cultural items are subsumed under the term of memes, from silly tunes through religious ideas to scientific theories. Memes as they spread, actually form the human mind. As Daniel Dennett points out about this interaction,

> *the heaven all memes depend on is reaching the human mind, but a human mind is itself an artifact created when memes restructure a human brain in order to make it a better habitat for memes.*
> (Dennett, 1995, p. 365)

It is important to emphasize that Dawkins himself does not treat his proposal as a straight biological theory of culture, but rather as a way of using biological metaphors. In his original proposal about memes (Dawkins, 1976, Chapter XI), he expressed his reservations about sociobiological theories of his time that intended to explain cultural altruism, for example, directly by kin selection mechanisms. Dawkins proposed memes as a more flexible mechanism to explain cultural variability and coherence. The essential point of memes is the extension of the replicative model. Wilkins (1998), in his historical treatment, points to this basic feature as well. In the interpretation of Dawkins (1976) himself, genes should not be treated as the single and exclusive forms of evolutionary processes. A Darwinist, he says, should not limit himself to genes. In this reading, genes are mere analogies. This is part of a controversy here. Others, among them the sympathetic interpreter, Dennett emphasize that:

> *Meme evolution is not just analogous to biological or genetic evolution … memes and genes … are just different kinds of replicators evolving in different media at different rates.*
> (Dennett, 1995, p. 345)

In fact, ever since Dawkins first outlined his memetic theory, three controversies show up in different forms and settings, from sympathetic considerations to serious social science challenges.

– *The analogy issue.* When talking about memes, we are on the level of analogies or identical mechanisms. Is the memetic way of talking part of universal Darwinism, or is it merely a part of the loose analogical models of social science?
– *Human creativity.* From the first moment of its appearance, as Dennett (1995, Chapter 12) points out, the meme proposal was questioned by social sciences and humanities, as another theory that challenges human creativity. While the critical issue with sociobiology and its likes was their questioning of human uniqueness, the issue with meme theory is a questioning of our autonomy and creativity, or, to put it in a more sympathetic mode, of putting them into their own place.
– *Survival value and meme replication.* Are memes by necessity replicating only if they contribute to biological survival? Not necessarily, as Dawkins (1982, p. 110) himself sees it when he talks about suicidal memes and the like. "The ultimate criterion for success in meme selection [is not] gene survival." Memes, as Dennett (1998) stresses in many places, are to be functionally interpreted in themselves, they

have their own functional considerations. But certainly some memes, like Biblical commandments do survive because they contribute to biological survival. All of this leaves a way for the social study of memes, since no one claims that any Lamarckian interaction would be present here between the memetic and the genetic levels. It is the content of the memes that have a feedback value towards the survival of their carriers.

The theory of Dawkins (1982) entails a peculiar view on memory as well: memes are information units in the brain that are physically present in the brain, that is one of the reasons they can be differentiated from their actual manifestations, their phenotypes. Dennett (1995) in his ironical style even suggests that in the distant future, a type identity relation might be found between memes and the corresponding brain processes.

As for a historical note, it is worth mentioning that at the same time as Dawkins proposed his meme theory in 1976, Vilmos Csányi, the Hungarian ethologist (1980, 1982), outlined a similar view in his theory about different levels of replication, and interpreted culture as a group-level replication of *ideas* formed in the human brain. In his proposal, ideas were not unlike memes for Dawkins. The attempt to extend the replication idea to culture became a favorite topic from the late 1970s on, and continues to be with us ever since.

Thus, the crucial element for Dawkins is *replication*. As it is well-known, the provocative sense of the metaphors used by Dawkins (1976) is the much-discussed idea that organisms are mere carriers of genes, and natural selection is directed not to organisms, but to genes. Similarly, human individuals as carriers of memes would have no control over their memes as they have over their genes. As Dennett (1995, p. 346) put this application into a slogan, so the not too appealing conclusion to the favorite domain of science would be: *"A scholar is just a library's way of making another library."*

Dennett elaborated this in a more careful manner as well.

> *In the domain of memes, the ultimate beneficiary, the beneficiary in terms of which the final cost-benefit calculations must apply is: the meme itself, not its carriers. This is not to be read as itself a bold empirical claim, ruling out (for instance) the role of individual human agents in devising, appreciating and securing the spread and prolongation of cultural items. It is rather a proposal that we adopt a perspective or point of view, from which a wide variety of different empirical claims can be compared, and the evidence for them considered in a neutral setting, a setting that does not prejudge these hot-button questions.*
> (Dennett, 1998, p. 8)

In the case of memes, Dawkins does not seem to care too much for the nature of this process of transmission,

memes propagate themselves in the meme pool by leaping from brain to brain via a process which, in the broad sense, can be called imitation… If the idea catches on, it can be said to propagate itself, spreading from brain to brains.
(Dawkins, 1976, p. 206).

In this loose portrayal of transmission there is a lot of space left open for social science that studies the very process of this "leaping from brain to brain."

As for the general model, not only his critics, like Boyd and Richerson (1985, 2000), but Dawkins himself too saw the limits of his analogies to begin with. On the other hand, he and some of his followers also saw the power of this structural analogy. Most importantly, similar to systemic influences in genetic copying and recombination, one could imagine interactions between selections on given loci in the meme pool, too. Thus, one can foresee a population memetics compared to population genetics. Here is a list of the considerations raised by Dawkins (1976) that are still valid.

– The copying process in memes is most probably much less precise than in memes.
– Some Lamarckian feedbacks might be imagined. Recently this is interpreted rather in the light of feedbacks from the niche (Laland, Odling-Smee and Feldman, 2000), or the impact of culture-created cranes, ideas and mental tools on our own development (Dennett, 1995).
– In meme selection, an important factor is the presence of other memes in the meme pool. Selection favors memes that use their cultural environment to their advantage (Dawkins, 1982).

The issue that was immediately raised in connection with the meme theory, namely the issue of analogical thinking versus real causal models is central for all social scientists thinking of memes. From the point of view of social science, the issue is how comprehensive the theory is. The gene–meme analogy is certainly appealing if we have in mind sudden outbursts of fads and fashions (think of fads in children's and adults's games). Can one, however, take over this automatic, uncontrolled and unweighed view of knowledge transmission to all sorts of knowledge, or unlike the case of fashions, do we ourselves as evaluating individuals and communities have a decisive role in what gets transmitted, or imitated?

As Dennett (1995) and Wilkins (1999) note, the favorite examples of Dawkins all come from the integration and spread of representations in science. His aim is to make sure that meme-like transmission does not work only over lower types of knowledge. Scientific notions, theories, and even paradigms would show the same principles as fashions in the sense that the imitative transmission pattern would be prevalent there, too. Of course, if the scope is widened, there is space for real social science to come in regarding the actual distribution patterns. I shall return to this issue later. Let us first survey the full scope of meme-like transmissions in humans, as presented by Wilkins in **Table 10.3.** for the full scope of all evolutionary analogues. This is of course an extension of the models entertained by evolutionary epistemologists following Popper (1972), when they treated different models of knowledge change on the basis of the same generation-selection cycle (Campbell, 1974, 1982), as portrayed in **Figure 10.1.**,

Table 10.3. Evolutionary analogues between different domains
(after Wilkins, 1999, p. 14, simplified)

Entity (e) or process (p)	Biological	Memetic	Science	Language	Economics
Interactor (e)	Trait	Pheme	Experiment	Linguistic behavior	Transaction
Replicator (e)	Gene	Meme	Theory	Morphemes	Account
Lineage (e)	Species, phylum	Traditions	Research program	Language group	Business, industry
Reproduction (p)	Organismic reproduction	New profile	Training	Language acquisition	New enterprise
Code (p)	DNA alphabet	Semantic	Semantic and mathematical	Grammar and lexicon	Currency
Encoding medium (e)	Amino acids	Neural structures, practices	Neural structures, journals, books, associations	Neural structures printing, writing, radio, internet, etc.	Notes, receipts, bank files
Individual (e)	Organism, colony	Memetic individual	Scientist	Speaker	Economic agent

as a matter of fact, Campbell (1974) summarized the ten different levels of use of the trial-and-selection notion along the lines of a Popperian evolutionary epistemology, from the trials of the paramecium to science. This is what is simplified by Dennett (1995) into his notions of Darwinian, Skinnerian, and Popperian creatures, but this is what was already attempted by Karl Bühler (1922) in his theory about the three domains of selection (instinct, habit, and intellect). The details of this process are not relevant here (see Pléh, 1999 about them). It is important, however, that the way Wilkins extends them goes along the line of the original late nineteenth-century extensions, where biological, mental, economical phenomena were all treated in a selectionist framework.
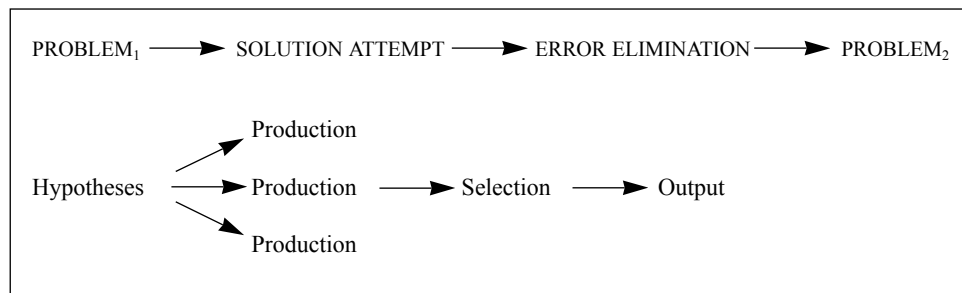
Figure 10.1. Knowledge change as generation followed by elimination
according to Popper (1972)

On the other hand, as again Dennett (1995) reminds us, Dawkins himself is far to see us at the mercy of our memetic machinery. Humans can revolt against the tyranny of their own fate: "We are built as gene machines and cultured as meme machines, but we have the power to turn against our creators" (Dawkins, 1976, p. 215).

The first issue to consider within the domain of this analogy is what constitutes the *selectionist moment* in the case of memes? (Incidentally, this is a crucial issue for all such extensions, like it is the crucial issue for Neural Darwinism, as well, where Edelman [1987] tries to treat perceptual learning-like recycling phenomena as analogues to selection). One option is the seemingly trivial interaction between the levels, the meme increasing the reproductive success of the meme carrier individuals. This would be a special case of gene-culture coevolution. It has a basic problem, as Sperber (1996, p. 114) puts it: "Gene-culture coevolution is … too slow a process to explain cultural changes in historical time." This sort of harmony between the two levels is only one type, however, and as Dawkins himself mentions mockingly, it could hardly explain the meme for celibacy. In general, memetic theory is forced to resort to seemingly self-explanatory explanations. Memes, some of them at least, have a strong psychological attractiveness, Dawkins suggests they are somehow having a good fit to the system of the other memes. But for Dawkins, unlike the traditional Darwinian models, the essential point about representations and culture is not selection in the Darwinian model, but rather the spreading of representations.

In any case, one feels here the danger of self-explanatory circularity: memes survive because they have this mysterious attractiveness. Dawkins himself sometimes gives the impression that through imitation, he would like to treat the spread of memes as a runaway process. But for the critical social scientist reader, it seems to be that psychology is missing from the conception of Dawkins. In fact, one the advantages of Sperber's theory to be discussed below is his emphasis on psychological factors in the spread of representations.

Susan Blackmore (1999) presents memetic theory as an intellectual follower of evolutionary epistemology. Her new emphasis is the centrality of imitation in the formation of the entire memetic enterprise. Those individuals were selected in the human prehistory, who were especially good imitators. The primary moment would thus be not the replication of specific contents, but rather the spreading of a procedure. This intial Darwinian selection would create the memetic field. Imitation itself, however, is rather mechanistic copying for Blackmore. This is in variance not only with modern theories of imitation (see Gergely, Beckeding and Király, 2002), but with earlier theories of Campbell (1988) and even James Mark Baldwin (1894), who insisted on imitation itself being a selective process that has the initial function of shortcutting trial and error.

Culture as an epidemiological pattern

In traditional visions of a sociobiological kind (see the volume of Crawford, Smith and Krebs, 1987 for a comprehensive overview), the source and controller of cultural evolution is biological evolution. In the framework proposed by Dawkins, there are indications for an independent cultural level.

Neither evolutionary approach [sociobiology and memetic theory] gives too much space for cognitive mechanisms, the existence of which are only treated as background conditions for the more or less autonomous choice of cultural features.
(Sperber and Hirschfeld, 1999, p. 122)

In the epidemiological theory of representations, a most characteristic rival theory is proposed by Dan Sperber (1985, 1994, 1996), in which the basic emphasis on explaining the diffusion of ideas is moved to cognitive factors. For Sperber, the basic issue is the constant move of representations between the individual and the public forms. This dual nature of representations (that they exist in the human brain and out there, as well) would be the key for his general dual materialistic vision of culture and thought.

Mental representations and types of public performances stabilized in this causal process of transmission [between individual and public representations] are recognized as culture.
(Sperber and Hirschfeld, 1999, p. 122)

Everyday communication, as well as social science, is full of metaphors that compare the distribution of representations to that of *diseases*. We talk about "thought contagion" and "infectious ideas". Nineteenth-century bacteriology and social science also tended to see parallels between parasitic infections and the social diseases of human communities. These metaphors from the time of Pasteur and Zola on have always emphasized the negative aspects, however: the similarity between human social "diseases" and epidemics. The negative metaphor is still with us: many cultural critics talk about media effects using virological metaphors. In the work of Sperber, however, the epidemiological analogy loses its negative connotations: for him, epidemiology is a general mental model to talk about the distribution of representations.

When he tries to use an epidemiological model for representations, Sperber does not start off from considerations of the "social disease" metaphor. He goes back to another late nineteenth-century issue of social epistemology: how one can have social patterns of the mind valid over large groups of humans, when at the same time society has no units carrying representations, there is no "group mind" as entertained by others, there are but individual nervous systems. For Sperber, this is the initial question: how can we have social representations when there are only individual minds? In his view, the relationships between individual and social representations are similar to the relationships between internal medicine and the epidemiology of diseases. Certain infections are subject matters for internal medicine if you study how they develop in individual organisms, but they are objects of study for epidemiology departments at the same time if you are interested in the patterns of transmission of the diseases. Studying its epidemiology does not create a new entity from pneumonia. Social science, like anthropology, social psychology, sociology would similarly be interested in the diffusion of representations formed in the individual mind, but by doing this it would not create new entities. Representations themselves exist in two material forms in this respect: as patterns in the individual nervous system, and as public signs in a physical format. Interindividual fac-

tors, such as power, attraction, and opinion leaders determine which direction representations spread and which representations tend to become popular.

From the point of view of a proper understanding of the ambitions of Sperber, it is worth emphasizeing that his theory in many regards is reminiscent of Durkheim (1982). Raymond Aron, in his historical work on social theories, emphasises this crucial interplay between the social and the individual even in the substantial theories of Durkheim about suicide: "One can summarize the theory of Durkheim in the following way: suicides are individual phenomena essentially caused by social factors" (Aron, 1967, p. 339). Sociology for Durkheim, stresses Aron (1967), is an autonomous science since it has the same relation to individual psychology as biology has to inorganic studies. It is worth summarizing how Durkheim saw the relationships between physiology–psychology and psychology–sociology. **Table 10.4.** provides this summary, relying on Némedi (1996).

Table 10.4. Parallels between the relations of physiology and psychology and the relationship between psychology and sociology according to Durkheim

Relation pairs	Traiditonal view	New view	Place of new science
Physiology– psychology	Physiological reductionism	Mental is the pattern of individual brain processes	Non-reductive independent psychology
Psychology– sociology	Psychologism	Social patterns over individual phenomena	Non-reductive independent sociology

The key in both cases, both in the brain–mind and in the mind–society relationship is a non-reductive pattern-based view: a century later, this would correspond to the epidemiological vision developed by Sperber. Higher organizations do not introduce new entities, but their laws are autonomous since they are laws of patterning over the lower level entities.

Let us a take a closer look on how Sperber develops his similar ideas.

The human mind is susceptible to cultural representations in the same way as the human organism is susceptible to diseases. […]

Consider a human group. That group hosts a much larger population of representations. Some of these representations are entertained by only one individual for but a few seconds. Other representations inhabit the whole group over several generations. Between these two extremes, one finds representations with narrower or wider distributions. Widely distributed, long-lasting representations are what we are primarily referring to when we talk of culture. There exists, however, no threshold, no boundary with cultural representations on one side and individual ones on the other. Representations are more or less widely or lastingly distributed, and hence more or less cultural. So, to explain culture is to answer the following question: why are some representations more successful in a human population, more 'catching' than others?(Sperber, 1985, cited after Sperber 1996, pp. 57–58)

The search for this answer is supported by the epidemiological metaphor. Epidemiology can be extended from the distribution of diseases to good health, or to anything: "One can have an epidemiology of representations. But whatever 'epidemiology' one is considering, it has to be defined in relationship to some sister discipline" (ibid, p. 60). As Sperber puts it,

> *What psychology is to epidemiology of diseases, psychology of thought should be to the epidemiology of representations: I expect the epidemiology of representations, and therefore the causal explanation of cultural facts, on the one hand, and the psychology of thought, on the other, to stand in a relationship of partial interpenetration and mutual relevance.*
> (Sperber, 1985, cited after Sperber, 1996, p. 59)

This stance about levels of analysis is closely related to issues of reductionism. Sperber in this regard is a self-declared materialist, without being a reductionist:

> *Most discussions of the relationships between anthropology and psychology […] have been in terms of reductionism versus antireductionism. […] For reductionists, cultural facts are psychological facts to be explained in psychological terms; for anti-reductionists, cultural facts belong to an autonomous level of reality, and have to be explained essentially in terms of one another. I believe that neither reductionism nor anti-reductionism make much sense in this case, and that the epidemiological analogy provides a more plausible approach. […] What I want to suggest with the epidemiological analogy is that psychology is necessary but not sufficient for the characterization and explanation of cultural phenomena. Cultural phenomena are ecological patterns of psychological phenomena. They do not pertain to an autonomous level of reality, as anti-reductionists would have it; nor do they merely belong to psychology as reductionists would have it.*
> (Sperber, 1985, cited after Sperber, 1996, p. 59–60).

Society in the epidemiological model is to be studied with a dual materialistic attitude. An exchange of representations is characteristic of society: individual representations take a public form (in speech, for example), and in this way, they turn into public, social representations, or into social fact according to Durkheim. Thence, due to being communicated, they become individual representations again, and so on. This is a dual materialism since it takes individual representations to be patterns of brain activations, while social representations, thus culture itself, are interpreted to be a distribution pattern of representations.

Sperber as a social scientist is much more sensitive to the multiplicity of mechanisms than Dawkins. When he introduces the analogy, he already talks of the possibility of distribution patterns of different organizations.

> *The epidemiological analogy is appropriate in yet another way. The distribution of different diseases – say malaria, lung cancer, and thalassaemia – follows different patterns, and falls under quite different explanations. So, while there is a*

114

general epidemiological approach characterized by specific questions, proce-
dures and tools, there is no such thing as a general theory of epidemiology. Each
type of disease calls for an ad hoc theory, and though analogies are frequent and
suggestive, there is no principled limitation on how much different cases might
differ. Similarly, the project of a general theory of culture seems to be misguided.
Different cultural phenomena – say funerary rituals, myths, pottery, and color
classifications – might well fall under quite different explanatory models. What
the epidemiological analogy suggests is a general approach, types of questions
to ask, ways of constructing concepts, and a plurality of not too grand theoreti-
cal aims.
(Sperber, 1985, cited after Sperber, 1996, pp. 60–61)

This centrality of the idea of variable transmission patterns is much in contrast with the unifying ideas of Dawkins. A characteristic example for this multitude is the comparison of distribution patterns in traditional and modern societies.

[When I talk about cultural facts in terms of an] epidemiology of representa-
tion[s. T]here are, to begin with, some superficial similarities. For instance, a
representation can be cultural in different ways: some are slowly transmitted over
generations; they are what we call traditions, and are comparable to endemics;
other representations, typical of modern cultures, spread rapidly throughout a
whole population but have a short life-span; they are what we call fashions, and
are comparable to epidemies.
(Sperber, ibid, p. 58)

The epidemiological analogy of course has its serious limitations. They are mainly related to the fact that during the transmission sequence indicated in **Figure 10.2**, the infiltrating agent, the representation itself changes, while in disease epidemiology, the bacterium or virus does not change as a rule, its changes are to be explained. Thus, essentially while this disanalogy was well seen by Sperber "representations […] tend to be transformed in time they are transmitted. […] The replication, or reproduction of a representation, if it ever occurs, is an exception" (Sperber, 1996, p. 58).

   Here again, general modulating factors show up, not unlike in the case of Dawkins. Some representations are especially well preserved, and these are the ones that distrib-
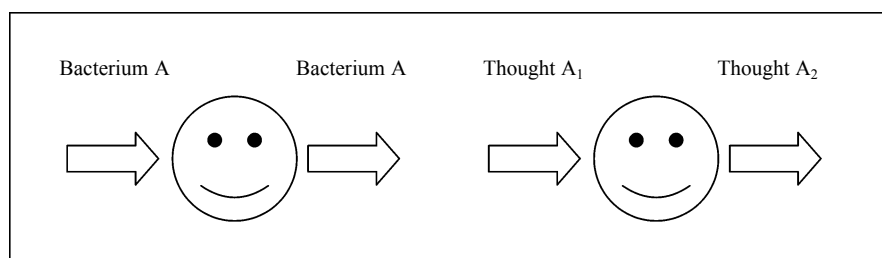
Figure 10.2. Disanalogies between disease epidemiology
and epidemiology of representations

115

ute easily in oral societies. The cognitive factors responsible for the preference of certain types of representations – Sperber specifically alludes to narrative patterns here – are to be found in universal biological features of humans. Thus, in the constant flux of transformations stabilizing attractors have a cognitive-biological foundation. On the other hand, some of these constraints and governing factors are of an ecological nature. Education, social status and position have a decisive importance in determining the spread of representations. The little Red Book of Chairman Mao was certainly cognitively easy to absorb, however, in the diffusion of its representations, a more decisive role was played by a certain type of human ecology.

A comparison of the two views

Though the two views were proposed at about the same time (Dawkins advanced his meme theory in 1976, and Sperber had his provocative talk on epidemiologies in 1984), hardly any serious direct comparisons exists of the two. Their inspirations come from diverging chapters of life sciences – genetics, on the one, hand, and the ontology of the mental and the social realms, on the other, and not surprisingly their internal status and message are different as well. **Table 10.5.** shows a summary of their divergences. In the genetic analogy, *repetition*, while in the epidemiological model, *transmission* and *transformation* are the key moments.

Table 10.5. A comparison of meme theory and the epidemiological theory about the diffusion of representations

Aspects	Meme theory	Epidemiology
Emphasis	Static	Transmission
Variations	Replication	Modification
Inspiration	Genetics	Diseases
Explanation	Unified	Case-based
Social Science	Marginal	Pattern-based
Goals	Reduction	Culture Theory

A substantial aspect in meme theory is the assumed similarity between genes and memes, focusing on replication. There is a moment of abstraction here, as well, of course that is related to the gene-meme similarity. Memes are virtual entities as well, as genes are. The relationship between them and actual behavior is like the one between genotype and phenotype. In fact, Dawkins (1982) might defend, as Sperber (2001) also clarifies in his critical paper, that in fact it is the instructions in certain cases (like instructions to draw a star) that constitute the genotype, and not copying the actual behavioral output. This is elaborated in the comparisons proposed by Wilkins (1999) and presented in **Table 10.3.** The abstract relationship opens the way for a more flexible treatment of culture. But if we stay with the analogy, what constitutes the analogy to lineage is unclear in memetic theory: it takes the loose form of "tradition".

Sperber himself stresses the differences between the two theories when he shows that the essential aspect of his approach is the centrality of internal factors as opposed to imitation in the memetic theory.

> *Memeticists have to give empirical evidence to support the claim that, in the micro-processes of cultural transmission, elements of culture inherit all or nearly all their relevant properties from other elements of culture that they replicate. If they succeeded in doing so they would have shown that developmental psychologists, evolutionary psychologists and cognitive anthropologists who argue that acquisition of cultural knowledge and know-how is made possible and partly shaped by evolved domain-specific competencies are missing a much simpler explanation of cultural learning: imitation does it all (or nearly so)! If, as I believe, this is not even remotely the case, what remains of the memetic programme? The idea of a meme is a theoretically interesting one. It may still have, or suggest, some empirical applications. The Darwinian model of selection is illuminating, and in several ways, for thinking about culture. Imitation, even if not ubiquitous, is of course well worth investigating. The grand project of memetics, on the other hand, is misguided.*
> (Sperber, 2002, p. 170).

What is the reference of diffusion theories?

It is an essential issue for both theories to consider what kind of knowledge they are diffusion theories of. Proponents of memetic theory and epidemiological theory as well usually have in mind explicit propositional knowledge. Culture, however, as it is well-known, is not formed only out of these declarative explicit pieces of knowledge, but from modes of behaving and prescription to behave in a certain way as well. Dawkins saw this for himself to begin with: "Examples of memes are tunes, catch-phrases, clothes fashions, ways of making pots or of building arches" (Dawkins, 1976, p. 206). When they are talking about what constitutes a meme, in fact, both Dawkins and Sperber realize that they have to deal with "instructions" as well, not only with pieces of information. **Table 10.6.** attempts to give a classification of the types of knowledge that might be involved.

Table 10.6. Types of knowledge concerned in diffusion theories

Type of knowledge	Examples	Memory system	Typical function
Specific knowledge	A tune of Elvis	Episodic store	Recognition
Categorical knowledge	Lemon is sour	Semantic store	Classification, judgment
Procedural skills	Fixing an omelet	Implicit skill store	Modes of action
Prescription	Do not steal!	Explicit rule store	Regulative commands

The first two types of knowledge belong to what is labeled as *explicit* knowledge according to contemporary theories of memory research, while the third one is of an implicit nature (Schacter, 1996). This distinction might very well entail some constraints on their diffusion as well. Explicit knowledge can very clearly become the object of conscious reflection. Therefore, explicit knowledge can be transmitted through relatively impersonal organized instructional interactions in a horizontal setting (typically in our societies through school instruction) and the individual pieces of knowledge can spread very efficiently through the mass diffusion channels of present-day media culture. These are the "ideas" that according to Dennett (1996) (and not without some resonances, to Popper, 1972) make memes into parts of the symbolic world that shape our cultural environment, that create "cranes". On the contrary, the typical context for the transmisson of skill-based knowledge is usually vertical face-to-face interaction. This is of course becoming more complex in present-day societies, where many of the skills are transmitted horizontally, rather than through intergenerational, vertical means. Laland, Odling-Smee and Feldman (2000) showed that there are interesting equilibration phenomena regarding physical adaptation and behavioral adaptation. Fast behavioral adaptation using niches can slow down the process of genetic adaptation: we build houses rather than growing furs. In a similar way, one could postulate an equilibration process between the role of vertical and horizontal transmissions, depending on the entire symbolic context of a society. As skills change faster, transmission becomes driven by many more horizontal factors since the knowledge store of previous generations tends to become obsolete soon.

This certainly leaves room for an interestingly articulated transmission process. All of this is not enough, however. Beside explicit knowledge and skills, *preferences* are also transmitted. We not only entertain popular tunes and car brands, but we also harbor preferences attached to them as well.

Dawkins (1986), when he puns on the possibilities of a general memetics, tries to postulate some seemingly quantitative, but in fact qualitative constraints here. Repeated informational pieces under a certain size limit are not candidates to be memes. Thus, two musical notes cannot be candidates to become memes. We can interpret this as saying that the operating level of memes is that of intentional actions so dear for Dennett (1987): only those things can become objects of meme-level replication that can be intentional objects.

Sperber also points out that repeated behaviors are not necessarily memes either:

> *Why is laughter not a meme? Because it is not copied. A young child who starts laughing does not replicate the laughters she observes. Rather, there is a biological disposition to laughter that gets activated and fine-tuned through encounters with the laughter of others. Similarly, an individual pushed into convulsive laughter by the laughter of others is not imitating them. The motor program for laughing was already fully present in him, and what the laughter of others does is just activate it.*
> (Sperber, 2001, p. 168)

118

In the epidemiological theory of Sperber, the real open issue is how to fill up the qualitative program with substance. Here again, the crucial issue is how to enter details of society, and relevant social science knowledge. How should one take the point of the analogy which suggests that similarly to the fact according to which "each type of disease calls for an *ad hoc* theory", one should have a differential epidemiological theory on different types of cultural knowledge? Any advance here would require a close reading of the available mass of social science data if one wished to make a real integrative theory of social science out of the epidemiological view. Examples taken at random do not suffice here. It is not enough to say that fashions are different from science, and the latter one is again different from religion. One needs a thought-epidemiology that would do the job of reverse engineering here: rephrase the empirical substantive material of social sciences into a framework of the diffusion of representations.

An interesting concrete example is given by Boyer (1994) regarding the epidemiology of religious notions. According to him, religions are "contaminating", and stabilize easily because they transgress certain aspects of our intuitive ontology about persons (agents), animals, plants, objects, while leaving others intact. A transgression of this kind shows up for example when the constraint for agents to be physical and biological beings is transgressed. This way we obtain the spiritualized image of God so characteristic for our culture. If personhood can go over to plants and animals, we obtain animistic religions.

Table 10.7. is an *ad hoc* attempt to classify modes of diffusion in an epidemiological frame. It is not intended to be exhaustive, nor is it argumentative. I merely intend

Table 10.7. Some characteristic ways of diffusion in contemporary society

Diffusion type	Speed	Time, personal	Time, generation	Typical contexts and domains
Gossip	Fast	Short, few days	Does not get through	Personal interaction, intimity marker
Fashions	Fast	Short, few years	Long cycles	Media idols and personal auhorities
Skills, procedures	Slow, years	Lifelong	Long term, several generations	Master–pupil relations, intimity and authority
Basic cultural skills (literacy, numeracy etc.)	Slow	Lifelong	Centuries (print, Internet)	Institutional education: persons and books
Life habits	Slow	Lifelong, irreversible	Changes over decades	Family and peer group
Religion	Slow, centuries	Lifelong, or almost	Long term, millenia	Personal and institutional
Science	Fast	Skill side slow, data side fast	"Paradigms" for centuries, empiria fast	Critical reference groups, journals, books

to show the types that can be differentiated in principle, depending on the personal involvement in transmission, the type of knowledge concerned, and the stability of the system.

It is evident, for example, that fashions in the everyday sense show up in all layers of life, and touch upon patterned diffusions that are not under the influence of rational filtering. Many of us do believe at the same time that this is not the whole story. Science creates a universe of discourse where rationality and the specific decision criteria create new secondary filters. Science certainly spreads like fashion, habit, and the like, but it also has as its basic constituent a decision mechanism taken to be impersonal. This implies that diffusion theories with a biologistic flavor are also related to the issue whether there is such a thing as disinterested science. Modern science certainly is involved in several competing and additive diffusion networks, which also relates to the traditional issue of how to conceptualize the relationship between science and common sense knowledge.

We are usually satisfied with a division of knowledge like the one proposed by Putnam (1975). I roughly know what genetics or particle physics are, and happily leave the rest for the experts. These assumed relations between everyday knowledge and scientific knowledge can be easily different even regarding science. Moscovici (1960), one of the founders of representation research in social science, showed in his studies on the representation of psychoanalysis how the structure and content might change due to mass diffusion. These transformations were not random, and could be interpreted according to cognitive–ecological constraints. The crucially interesting aspect, however, is the very fact that changes also involve changes in what constitutes the evidence for the given representation.

A further aspect to be elaborated in comprehensive diffusion theories is the "self-limitation" of propagation. Feelings like "being fed up with something" have an impact here, too. It is like, to take our parallel again, the exhaustion of epidemics. This mental satiation or exhaustion has some internal causes. Our constant need for novel representations is a strong constraint here. As Colin Martindale (1990) pointed out, cyclic changes in painting, poetry, drama, and prose can be related to similar satiation phenomena that are valid both over individuals, and over creative and receptive communities. Too much personal and instinct-based poetry after a while leaves place for a more objectivistic and intellectual kind of poetry. For our present purposes, this is merely a warning sign: diffusion has not only preference-related constraints, but built-in internal constraints as well.

A broader evaluation

Biologically inspired diffusion theories have to face the challenge whether they are mere biological *analogies,* or they are meant to deal with real explanatory mechanisms. The epidemiological theory is more appealing to me, since it not only acknowledges its metaphorical nature, but with its repeated emphasis on cognitive mechanisms, it promises to be transformed into a taxonomic model, if not an explanatory one. In order to do this, however, the theory has to be used, at least on the level of case studies. This

is still to be seen. This is true of the much more popular memetic theory as well. Many slogans and popular presentations are followed by little actual social science research. Even amongst the sometimes vitriolic critics, however, one should not forget that as Runciman (1999) pointed out, these diffusion theories navigate in a narrow strait. On one side, they are threatened by the extended pure sociobiological theories, and on the other hand by varieties of culturalism that even include providential creationist approaches. Their analogical nature, middle-of-the-road attitude, and questionable heuristic value notwithstanding, they are still serious attempts to combine culture and evolution in a non-trivial, non-reductionist way.

Cultural and biological evolution are many times dissociated as a reaction against nineteenth-century evolutionism. A sympathetic summary of this issue is given in **Table 10.8.** from a partisan evolutionary epistemologist. (Incidentally, a similar survey is given by the otherwise innovative textbook of Barrett, Dunbar and Lycett, 2002.)

Table 10.8. Relationship between organic and cultural evolution (after Wuketits, 1990, p. 133)

Organic evolution	Cultural evolution
Slow process	Fast process
Goal-oriented process, with no intenionality	Goal-oriented intentionality
Acquired features not inherited	Acquired features "inherited"
Genetic type of information	Intellectual information
Intraorganic continuity of information processing (genetic transmission)	Extraorganic continuity of information processing (cultural transmission)
Birth of several species	One species – many cultures
No borrowing between lineages	Borrowing between lineages

This is the usual portrayal. Diffusion theories, however, tend to see similarities between these two types of replication. Wispé and Thompson (1976) summarized what kinds of different interpretation were given to the parallels and divergences of biological and social evolution introduced and emphasized by Campbell (1974, 1975), the epistemologist forerunner of present-day evolutionary psychology. Many have pointed to the speed of cultural change, as opposed to the conservativism of biological evolution, and the Lamarckian nature of cultural change. These interpretations are summarized in **Table 10.9.** They are presented together with a strong criticism given by Hull (1982), who questioned the simplified contrasts.

When Hull (1982) took up this comparison, he pointed out that a naive opposition is based on an oversimplified interpretation of biological processes. It is not true, for example, that biological categories (species) would be sharply delineated. On the level of concept formation, both biological, and cultural, e.g., scientific categories are dynamically changing, "historical" categories. As far as change itself is concerned, communities of scientific communications correspond to genetic lineages. Human communities are not fixed, as biological species are not fixed either: they may separate when communications stop, in the same way as species bifurcate due to isolation. And

Table 10.9. The emphasis on differences between biological and cultural evolution
and their critic by Hull (1982)

Opposition	Biological evolution	Cultural evolution	Hull's criticism
Category boundaries	Biological: sharp	Fuzzy, mushier categories	Species is a dynamic concept as well
The course of change	Darwinian: selectionist	Lamarckian: intructionist	Instructions in culture: not omnipotent
Teleology	No goals	Goal-driven processes	Culture has accidental features as well

what concerns intentionality and goal-directedness, both Hull and the diffusion theories are in accord with the views of Dennett (1987, 1996). We humans freely apply the intentional stance, but this should not create the illusion that teleology would be valid in the outside world as well. As Dennett (1990) in a paper with a provocative title pointed out, there is no principled difference in the human treatment of evolution, the interpretation of each other as intentional agents, and the interpretation of cultural objects, like literary works, and other human artifacts. Regarding all of these, one can take the intentional stance, but we should not take this too substantially but only as an interpretive strategy. Thus, in this regard, there is no difference between biology and culture.

Barrett, Dunbar and Lycett (2002) show in their textbook that even the identical versus loose reproduction, as an opposition between biology and culture, is rather questionable. **Table 10.10.** shows their comparison of "heritabilities" in biological and cultural traits. Interestingly enough, some of the cultural traits show as much correlation within human populations as biological traits. This is a strong argument for horizontal memetic transmission, or "imitation" – as strong as biology is in determining our outlook. As the authors themselves say, "[C]ultural transmission, it seems, is both reliable and surprisingly robust by comparison with genetically transmitted traits" (Barrett, Dunbar and Lycett, 2002, p. 356).

In their own theories, both Dawkins and Sperber represent a variety of biology–culture continuity theories. They suggest that in any complex hierarchical system, there are typical mechanisms not only for the vertical integration of functions and information, but for the horizontal mechanisms for information integration as well (this latter would correspond to the diffusion of representations), and similar scientific principles should be used for their analysis on any level. This optimism is the Enlightenment aspect of these theories. In one respect, however, they present a rather pessimistic vision. Both theories basically underline the repetitive nature of human thought. One needs to have some similarly general theories to cover the innovative aspects of human thought. The theory proposed by Bartlett (1958), regarding the essential aspect of boundary crossing in human creativity is one of these, as well as that by Béla Julesz (1996), with his emphasis on scientific bilingualism. One can only hope that the two theories analyzed here belong to this fertile class of ideas when they try to combine biological imagination with the humanities.

Table 10.10. "Heritablities" of cultural and biological traits
(after Barrett, Dunbar and Lycett, 2002)

Cultural transmission		Biological transmission		
Trait	Parent–offspring correlation	Trait	Parent–offspring correlation	Heritability
Religion	0.71	Stature	0.51	0.86
Politics	0.61	IQ	0.49	–
Beliefs	0.49	Masculinity/femininity	–	0.82
Entertainment	0.44	Span of hand	0.45	–
Habits	0.24	Forearm length	0.42	0.84
Sports	0.22	Hip	–	0.43

11. DECOMPOSING AND REASSEMBLING THE SELF: POSSIBILITIES OF MEETING COGNITIVE AND SOCIAL CONSTRUCTIONS

All novels, of every age, are concerned with the enigma of the self.
(Kundera, 1986, p. 23)

Three ways of questioning Cartesian unity

In contemporary psychology and cognitive science, several lines of arguments are raised against the Cartesian unity of the mind. This view itself was a theory with several lines of grounding. It was rooted in a particular theory of mind and the image of a particular social organization as well.

The central idea for Cartesians was the *unity of consciousness*. Human consciousness is indivisible, and is always conscious of one thing at one time. This image is the famous Cartesian Theater as some see it now (Dennett, 1991a; Dennett and Kinsbourne, 1992). There is an interesting social parallel to this rationalist image of the man. It corresponds to one trend of modernization, that of the overwhelming Central Planning. The integrative and integrated Ego would correspond to the idea of One God, One King, One Church. This is a Catholic, Royalist model of inner life, as Toulmin (1990) analyzes it in the context of the political and religious divisions of Europe.

The three dominant views that question this unity are summarized in **Figure 11.1.**

(1) Empiricist dissolution. The first conception is the traditional empiricist-associative dissolution theory that was initiated by David Hume. The Self is not taken as a stable point of departure, rather, it is a mere "bundle of sensations" that for practical purposes we do treat as stable, but we have to be aware of the hypothetical nature of this move. It is a mere fiction, a narrative gravitational point, as is said today (Dennett, 1991a), or a hypothesis that has evolutionary reinforcement, as proposed by Ernst Mach (1897, see Pléh, 1999 about their similarities).
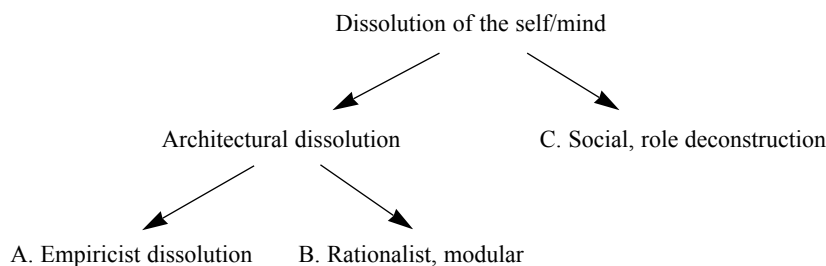
Figure 11.1. Three ways of dissolving the Cartesian unity of the self

125

(2) Rationalist, modular dissolution. The dominant dissolution view in cognitive science that questions Cartesian unity starts off from another aspect of the rationalist vision of the mind that corresponds today to a modular theory of mind (Fodor, 1983). This approach tries to interpret "higher", intellectual processes on the analogy of elementary sensory processes as the working of, as they say, domain-specific processing mechanisms. The main features of this conception are outlined in **Table 11.1.** According to strong proponents of the modularity view, this is valid, however, in another sense as well, regarding social cognition and the organization of the Ego or the Self. (For this extended modular view of the mind, see the volume edited by Hirschfeld and Gelman, 1994.) This "social modularist" view was traditionally promoted by faculty psychologists in the form of "moral" faculties, or even in that of the inborn "sympathy" (about this see Richards, 1992; Pléh, 1998). For present-day modularists, at least the lower two lines of **Table 11.1** hold for social and personality processes as well. They treat social understanding and self-interpretation as well as a result of the working of social modules based on evolution (Cosmides and Tooby, 1992). Our theory of mind, i.e., our theory of social behavior being mediated by an internal conscious agent, would be the result of the working of a domain-specific system of naive or folk psychology. We would be equipped not only by task-specific systems for the recognition of speech sounds, or faces and other highly complex cognitive achievements, but for the interpretation of each other as agents as well (Gergely, Nádasdy, Csibra, and Bíró, 1995; Csibra and Gergely, 1998; Tomasello, 1999). This would in a way close the classical division between two Cartesian traditions: that of a modular view of the mind, and that of an integrated vision of the mind, where for the latter aspect, the Soul was held responsible. One can, as Fodor (2000) suggests most forcefully, remain Cartesian, and hold the present-day Cartesianism of a modular trade, without postulating a separate soul and a unifying computational theater. The price you pay for this move is to postulate that basic forms of sociality, and self-organization would also originate in biologically organized modules. Both the external and the internal orders would have an evolutionary explanation.

Table 11.1. Some features of modular systems as outlined by Fodor (1983)

Basic feature	Arguments
Automatic, mandatory processing	Ambiguity: activation of irrelevant meanings
Fast, reflex-like	Early activation, shortcuts, garden path effects
Encapsulation	Modules are insensitive to other processors: only interact on the output level
Domain specificity	Only process-relevant information is considered
Innateness	They are activated early on

The extension of the modular view towards social cognition and self-representation is not without its own problems. The attitude refered to by Fodor (2000) as MM, or the thesis of Massive Modularity would lose any place for a central integrative process. In its evolutionary form, it would claim that different neural circuitries would specialize in different adaptational problems (Cosmides and Tooby, 1992). Sperber (2000), in his newest formulation, even proposes that a key to understand the workings of old time General Cognitive Mechanisms or General Problem Solvers (i.e., Cartesian souls) would be to postulate an entire metacognitive field that is responsible for the *representation of representations* (see Pléh, 2000).

Sperber (2000) in fact further subdivides this metacognitive domain into three modules, as illustrated in **Table 11.2.** The first one, corresponding to a Theory of Mind, and naive psychology, is the most widely accepted. He claims, however, a further comprehension-related, and another logical meta-module. Both of them are related to the intentionality-based metapsychological system, but this latter one in and by itself does not necessarily entail communication and logical coherence.

Table 11.2. Sperber's proposal for a multiple modular system for pragmatic aspects of language: metarepresentational modules (Sperber, 2000)

Proposed module	Main functions
Metapsychology	Theory of mind: thought attribution
Comprehension	Finding out communicative intentions
Logical module	Checking arguments

This attitude constitutes the most radical modular deconstruction option within the modular group (Sperber, 1996). Fodor (2000), the original promoter of a modular view of the mind, however, challenges this view. He is against an all-encompassing evolutionary decomposition, on the one hand, and he also questions the mental architecture that would leave out any place for an integrative computational space.

(3) *Social, role-based deconstruction.* Traditionally, the social decomposition views outlined a centripetal theory of the human mind where social interaction, external roles, and external control through gradual interiorization are assumed to become into an internal dialogue, self-control through the development of self, and internal control (Mead, 1934; Cole, 1996; Vygotsky, 1978). Presently, the image of social decomposition has taken a slightly new trend. Philosophical, developmental and social studies all converge in proposing varieties of narrative theories regarding the self. The novelty involved in these theories is that they try to find the sources for this secondary unification in *narrativity*.

The narrative move of deconstruction and secondary coherence

Regarding the philosophy of decomposing the self, the new trend, while it continues the tradition of Hume and Mach (Pléh, 1999), presents a crucial novel aspect: it goes along with a narrative metatheory. Dennett (1991a, pp. 426–427) puts it rather clearly:

> *A self, according to my theory, is not any old mathematical point, but an abstraction defined by the myriads of attributions and interpretations (including self-attributions and self-interpretations) that have composed the biography of the living body whose Center of Narrative Gravity it is.*

Narrativity and the genesis of human thought

This move towards narrative theorizing is present both in evolutionary models of human cognition and in theories about child development. A central role for narrative patterns is entertained in the evolutionary speculations provided by Donald (1991, 1993, 1997). His theory on the origin of human culture presupposes steps or grades, as summarized in **Table 11.3.** Two of these touch upon the issues that are specially relevant to us. One aspect is that Donald presupposes the existence of a *mythical culture* up to the time of the discovery of writing. Its essential feature is the dominance of orality, and the specific organizing role of narration and narrative patterns. Though this level of organization allows for categories, in contrast to mimetic culture, its essential feature is that it turns everything into a story, and purely logical and hierarchical structures do not characterize it. Interpreting this culture according to the principles of memory organization, though it is no more bound to individual sensory episodes, it is still characterized by episodic organization. *Theoretical culture* that supplements it is characterized by the dominance of written language. Its outstanding organizational feature is the exteriorization of memory organization, the creation of external memory stores. That provides for the possibility of our behavior to be regulated by metarepresentations created by us.

Narrative organization would be a primary human way of mental organization that fulfills both requirements for a meaningful psychology set up by Rom Harré (1986). It is of "historic nature" since narrativity organizes our memory in a new way by providing an anthropomorphic teleological order or metastructure for events. At the same

Table 11.3. Types of cultures and representations according to Donald (1993)
(m: million years ago)

Culture	Species	Age	Memory	Tradition
Episodic	primates	5 m	episodic events	none
Mimetic	homo erectus	1.5 m	body representation	enacting, mimicing
Mythical	homo sapiens	50,000	linguistic	narrativity
Theoretical	modern humans	10,000	external memory	fixed knowledge

time, it is of a social nature since narrativity provides this secondary or metaorganization in accord with a distributed, value-related social system, as it was emphasized by early theories of social memory (Halbwachs, 1925, 1950).

According to theories relating evolutionary and cultural psychology, both the social and the historical aspects are valid, not only for the organization of narratives, but for their use as well: everyday story-tellings provide the frame for creating cultural communities and constructing traditions. Narrativity is assumed to be a bridge, not only between the two disciplines, but between the two realms as well. The narrative reconstruction of reality is part of the process of how the societally organized representational systems create contacts between the natural and the cultural man (Tomasello, 1999; Sperber, 2000). This is the central point in Bruner's (1985,1997) vision of the ontogenetic role of narrativity as well.

Narrative metatheory as a new reconstruction of psychology

In contemporary mainstream psychological theorizing, it was Jerome Bruner (1985, 1987, 1990, 1996), and in the Hungarian context, János László (1999) who claimed for two basic modes of human cognition and attitude towards the world, as summarized in Table 11.4.

Table 11.4. The narrative and paradigmatic modes of cognition proposed by Bruner (1985, 1990)

Cognitive mode	Narrative	Paradigmatic
Organization	Temporal, sequential, human action-based	Timeless, categorical, logical (Platonic) hierarchical
Discourse representation	Story: intentional teleology	Description: relationships
Ideals	Uniqueness, episodes	Inpersonal validity
Embeddedness	Context: personal and social	Decontextualization

The concentration on actual stories, as intellectual and cognitive organizing tools, as interpreted by Bruner (1985, 1997), is part of the modern anti-essentialist movement. Self, as a safe Cartesian starting point and the world of stable objects is replaced by a world socially constructed through narratives and a self as well constructed by narration. The world of narration relates the social world and our inner world. This bridging would be a crucial anchoring point for the centripetal, interactionist world view.

The narrative turn, at the same time, would not be anti-science or literary, to use Bruner's (1997) own words. It would merely be part of a movement towards realizing a need for postulating multiple uses of human intellect in the drive to bridge evolution and culture. "Cognitive science should become the repository of our knowledge about *possible* uses of mind" (Bruner, 1997, p. 289).

According to traditional anthropological conceptions, this narratively-based cultural attitude would correspond to "hot culture" (Lévi-Strauss, 1962), while traditional

"cold culture" would go together with what Bruner refers to as paradigmatic culture. By "cold culture" Lévi-Strauss (1962) means those arrangements where categorial relations interpreted as timeless become more important and basic (e.g., taboos) than narrations in the organization of integral experience. Jan Assmann (1992) proposes that more is at stake here than a mere opposition between historical, cultural, on the one hand, and natural, prehistoric, on the other. "Cold cultures" consider repetition to be important for their memory. "The sense retained in memory here is to be found in the repeatedly returning events, in continuity rather than discontinuity… in the hot variety [however] the unique and special, growth and evolution, or even fall and disintegration have a meaning and importance, and are worthy to be committed to memory" (Assmann, 1992, p. 57).

János László (1999) points out that these attitudes do vary even within a single culture: we can approach one thing as an embodiment of categories, and as a representant of individual fates and events. Narrative metatheory as a non-essentialist view of coherence rather than postulating a substantial Self assumes that the coherence of our internal world is also provided by a softer thing, by story-telling. The issue of coherence in communicative terms implies that the partners, A and B have to follow a mutual, joint model. They have to allow each other to reconstruct similar relationships between the individual propositions. This is referred to as the maxim of relevance by the communication model of Paul Grice (1975), and as the issue of higher-order models of intentionality by Dennett (1987).

Seen from this perspective, traditional *narrative schemata,* with their mobilization of intentional action interpreting modules are rather powerful coherence-building devices. One of the clearest aspects of the transformation of these patterns in modern "high literature" concerns the changes in the comprehensive Plans of action from the point of view of the Hero and/or the Narrator. Its presence gives coherence to classical narratives, be it fairy tales (youngest boy wants to marry a king's daughter, sets out into the world, and through many obstacles gets her), or bourgeois novels (young hero comes to the big city, wants to make a career, relying on relatives and women reaches these goals). The comprehensive message of the work is tied to the intentional system of the hero. The final meaning (the life philosophy embedded in classical narration) is the idea that there is a continuous, intelligible life, with initiatives, that is full of Plans. These Plans give coherence of the man and of narration, as Kundera (1986) expresses it.

Narrative metatheory in three steps and on three levels of abstraction

It is worth considering that in fact narrative metatheory in contemporary psychology shows up on three different levels of abstraction, as indicated in **Table 11.5.**

The first level of abstraction, narrativity as a shematization device, as a crucial omnipresent scaffolding of our experience was first proposed by Bartlett (1932), and then extended into overall models as story organization from the work of Rumelhart (1975), Kintsch and van Dijk (1978), Schank and Abelson (1977). For our point of

Table 11.5. Narrative theories of different scope

Narrative theory	Task	Main proponents
Narrative schematization	Stories organize experience as intentional schemata	Bartlett, Rumelhart, Schank–Abelson, Kintsch–van Dijk
Narrative socialization	Stories teach us about intentions, persons, and actions	Bruner
Narrative identity	Group narratives provide for group identity and cohesion	Halbwachs, Galagher
Narrative metatheory	Stories teach us about normativity, and create the self	Dennett, Ricoeur

view, it is noteworthy that after a short excursion into strictly formal models, these efforts turned to theories of naive social psychology, specifically theories of attributed intentional action as the explanation for shematization effects (Black and Bower, 1980; Pléh, 1987; Halász, László and Pléh, 1988). In understanding stories, we mobilize our naive social psychology about the structure of human action and about the usual motives for action. Coherence is found by the hearer-reader through the projection of these motivated action schemata to the story.

Narrative socialization theory, as the second level of abstraction, not only postulates two types of cognitive organization as surveyed above, but also gives a model about the role of narration in building up different types of "landscapes" or overall structuring principles of the world. We learn not only to supply a teleological shema to all our experience, but we do learn to identify different *perspectives* as well (László, 1999) that help us to get to the personal points.

This is a crucial moment since, as Luciarello (1995) points out, in narrative theory there is a dangerous concentration on one single genre and way of thought, and as Sperber (1996) notes, a danger of ignoring the person by replacing it with discourse.

On the third level of abstraction, stories are *carriers of group identity markers*. In the organization of human mentality, as the classic of Hungarian social psychology Ferenc Mérei (1949) once said, "joint experience" has a peculiar surplus value. In the formation of this joint experience, memorable events are tied with the practice of joint storytelling, providing for the formation of a socially shared memory (Halbwachs, 1925, 1950). For Halbwachs, three issues were crucial for his social theory of remembering, and all of them are still essential.

(1) *Relationships between experienced, narrated and "real" history.* Social theory of knowledge, as analyzed, e.g., by Nyíri (1992) becomes a theory of narrated history in Halbwachs. As one of the analyzers of Halbwachs put it,

> *[Individuals] with their acts can change their memory store; these memories are his, however, only due to the fact that he belongs to different communities, associations, familial, political, economic and religious associations. These 'soci-*

eties' are the only storage units of the past. Thus, selection between ideas in individuals is directed from the outside rather then from the inside.
(Bastide, 1970, p. 91)

(2) *Double articulation in memory.* According to Halbwachs (1925), even our most intimate and individual representations (e.g., dreams) show the impact of a social articulation. Halbwachs along with his teacher, Bergson (1896) and Bartlett (1932), as well as the Russian Blonskij (1935), belong to the group of psychologists who claimed for a filtering and schematizing second articulation of memory that would organize the world of our images and neural circuits.

(3) *The primacy of the social.* For Halbwachs (1923), however, these organizing factors are of a social nature. Only due to the organizing force of group membership do we remember at all. According to Halbwachs, "Rationality itself originates in the group. As individuals, we hardly ever have mushy and uninterpreted experiences. This is due to the social moments, however, and not to the integrating power of he individual mind. Were we ever be left on our own, we would indeed only have a buzzing-booming confusion. Rationality itself has its sources in the direct social moments (as the influence of our group belongingness on recall) and in societal factors like language. In the situation of recall the group is present: we recall events according to our activated group membership" (Pléh 2000b, p. 440). Collective memorial practice is central for the constant recreation of identity. On the basis of memorial patterns in families, religious groups and social classes, Halbwachs claims that originally episodic memories become categorical.

This attitude is taken up in present-day narrative theories like that of Ricoeur (1990), for whom narrative identity is the key to understand the relationships between descriptive and normative aspects of life. According to a recent summary of Galagher (2000), a minimal (bodily) self is supplemented by a narrative self in humans. According to Galagher (2000), the interpretation of narrative self given by Ricoeur (1990) is a flexible construction in two respects. The constructed narrative self is only one of a series of instances, and other person's stories also contribute to the unfolding of this narrative self.

We have all reasons to believe that the two lines of intellectual development – modular and narrative decomposition – may converge in the future. The combination of modular architectural decomposition with the idea of narrative fluidity and developmental modularization may find its *lingua franca* in the narrative construction of our inner life. This would imply that some kind of social attributive system is the main organizing force behind constructed unities.

12. NARRATIVITY IN TEXT CONSTRUCTION AND SELF CONSTRUCTION*

The ubiquity of narrative patterns

Modern humanities and social sciences came several times to the conclusion that narration is a very special feature of human nature, and therefore, it is somehow a key to understanding humans. At first, this train of thought was mainly psychological and concentrated, or rather limited in its attempts to study the relationship between memory organization and narrative patterns. Provocative ideas were developed *vis-à-vis* the dominant world view, especially regarding elementary associationism.

In classical psychology, the issue of narration first emerged in connection with a critic of association as an explanatory concept. The British experimentalist Sir Frederick Bartlett (1932), the French clinician Pierre Janet (1928), and the Russian educational psychologist Pavel Blonskij (1935) have all advanced narration as a basic non-associative organizing principle of the human mind. For Bartlett (1932), narratives were the key moments in *schematic memory,* which was already characterized by Alfred Binet (Binet and Henry, 1894) as the mirror of thought. Blonskij (1935) also believed that narrative organization is the key to "logical memory". Pierre Janet (1928) even claimed that logically organized text was a key to rationality, since the origin of rationality should be looked for in interpersonal coordination.

More distant intellectual antecedents can also be traced since this first narrative trend in psychology was part of a dissatisfaction with elementaristic experimental psychology at the turn of the 20th century. The dual memory system proposed by Bergson (1889) can be interpreted as a duality between the memories of the body (habits) and meaningful, personalized memories. The human brain is a storehouse of habits, but it only provides an access route to personal souvenirs, which themselves are not identical with any "memory traces". In order to interpret and personalize something, a royal way is to assimilate it to a schema, provide a story-like narrative structure to the random data of our memory system. (For an interpretation of Bergson along these lines, see Pléh, 1989.)

The French social school of psychology, partly reflecting on Bergson, went further. For them, the personally interpreted experiences of Bergson turned into socially constructed experiences. They moved to a position that denied the existence of "raw, uninterpreted experiences" altogether. In this process, narrative organization became a key

element of human life. Maurice Halbwachs (1925, 1950, 1992, 1994), in his work on collective memory, which is still the standard reference point for studies on historical memory, presented narratives as being responsible for the social nature of our memory in two regards. Social groups build up their community life by inventing and sharing stories, thereby creating a common interpretation of experience. The "substance" of community life is inherent in stories. The social aspect has a structural side, as well, however. Narrative organization prevails even in our most private memories, in our dreams and daydreams as well. Structurally, all our experience is socially organized. There is no such thing as socially non-interpreted mental content. Whatever comes to our mind becomes intelligible through the intervention of the "social moment", and this social moment is provided by narratives.

The social aspect for Halbwachs was an "intentional issue", and not that of the relationship between stable external and internal objects. In this way, with the rejection of the "objecthood" of memory, Halbwachs opened a road towards constructive theories, both regarding memory and constructing the person (Pléh, 2000).

Their philosophical roots notwithstanding, these first narrative theories failed to become paradigm-setting alternative approaches to psychology and in the humanities. They had relatively little affinity with the philosophies of their time, and while they had a clear conception about the role of schemata and their social origin, they did not succeed in winning the interest of epistemologists, and did not succeed in trying to propose a general theory on the origins of Self and personhood based on the notion of narrative schemata. Interestingly enough, the strong alternative paradigm at the time of the first narrative theories was articulated in the domain of the psychology of perception as Gestalt theory.

The first narrative models were also insensitive to the dramatic changes going on in their own time in the narrative patterns of modern European literature. On the other hand, it is true as well that early constructionist theories of selfhood in philosophy were also uninterested in the issues of narration. The recent affinity between these three areas indeed indicates a definite change in cultural climate. This is rather a present-day development, just like the search for parallels between changes in contemporary prose writing and our conception of identity and the Self.

Narratives in present-day cognitive studies

The high time of narratives in psychology came back from the late sixties on. However, the narrative patterns were imported to psychology from folklore, anthropology and literary studies, and while they infiltrated psychology, they soon reached a level of generality touching upon philosophical issues, such as the relationship between story-telling practices and our naive notions of personhood.

Through the rediscovery of the works of the Russian folklorist Vladimir Propp (1928/1958), anthropologists realized that strict rules or regularities are hidden behind the fantasy-rich world of our tales. Tales are by far not the terrain of irregularity and unconstrained fantasy. Rather, they are characterized by a limited number of "roles" and "functions", they have a culturally constrained repetitive structure.

134

In this new trend, narratives started to carry two basic notions for social sciences and the humanities: *order* and *"surplus value"*. Order implies that connected discourse is no more a mirror of the chaos of the world, but rather, follows a set of *constraints*. These embody an underlying pattern that goes beyond the mere concatenation of propositions. In the new, linguistically-minded trend this suggested to look for a pattern that goes beyond individual sentences to find the real patterned meaning in discourse. In actual research, this would both mean an emphasis on the "surplus value" of discourse as compared to a set of individual sentences, and an ideology which sees a world view hidden in the organization of text (Greimas, 1966; Todorov, 1969). The new structural approach to stories had some resemblance to the previous starting from social schematization and constraints, but it had a stronger linguistic emphasis. It also had similarities to earlier Gestalt approaches, but now, with the linguistic turn in full force, the "enemy" is not the idea of elementary sensation, but atomic sentences.

Psycholinguists have come in touch with this structural approach to narrative organization through reviving the concept of *schemata*. Narrative patterns turned into something crucial for the psychologists because they promised to provide a substantial anchoring point for the otherwise elusive concept of schemata. Schemata, interpreted in a narrative way are not simple products of the constructive powers of the individual mind, rather, they are interpreted as being anchored in an external social order. The patterning inherent in narration promised to give a really interpreted view of schematization, which had unexpected consequences for our conceptions about ourselves.

Empirical story research in present-day cognitive psychology

> *Out of the mysterious and chaotic fabric of life, the old novelists tried to tease the thread of a limpid rationality; in their view, the rationally accessible motive gives birth to an act, and that act provokes another. An adventure is a luminously causal chain of acts.*
> (Kundera, 1986, p. 58)

In modern psychological research on discourse memory usually two types of processes are highlighted: *integration* and *selection*. Whatever one remembers from a text is at the same time more and less than the text itself. Bridging informational gaps between the different propositions becomes part of the representation, which is a coherent causal chain (Schank, 1975). Complex and unclear texts, on the other hand, are simplified and converted into a more logical version. In this process we act as if we found the leading propositions underlying the text.

These general principles are valid for remembering all sorts of texts. Why are narrative texts so special, why are they, for example, so much easier to understand and remember than other texts? (See a detailed argument for this ease in Zinchenko, 1961.) Present-day psychological studies look for the explanation of this superiority in the general organization of narrative patterns. While the organizing moments are easy to mobilize, they can turn into overall mental models at the same time, keys to the understanding of other processes, such as the interpretation of real events.

Some relevant features of narratives

(1) They represent a *temporal organization,* where the order of some (the critical) propositions is assumed to be the order of events in real life. Due to this feature, narratives are apt to be used and treated as causal models of events and actions. Labov and Waletzky (1967) used a distributional analysis to formalize this in spontaneous narratives. Narrative clauses in spontaneous storytelling are partially ordered, thus providing the basis for "narrative time". This has an interesting developmental aspect, as Bruner and Luciarello (1989) and Bruner (1996) highlighted it: a temporal perspective in the child's mind is formed in the process of storytelling. One can of course go further, and claim, as Janet (1928) already did, and as Ricoeur (1965) and others do today, that the psychological time dimension comes from narration altogether (see Modell, 1993 about this).

(2) Stories as a special type of narration require *a hero, who has a system of goals, as well as a perspective*. Perspective (whose vision of the world we use) characterizes not only higher literary forms, but all narratives. The hidden philosophy of stories is given by the problem-solving path of the hero, within a motivational field created by by the goal system. The essence of this "philosophy" is the coherence in the actions of the hero. A further step is provided by the idea that heroes are intentional agents, and that human actions performed by these agents form causal chains based on reasons and causes (Schank, 1975; Graesser, 1996). From a developmental perspective this suggests that by distinguishing between outside ("real life") events, the inner life of the hero, and the reactions of the narrator, storytelling practices foster the distinction between objective reality and mental reality. (See the volume edited by Bruner and Hastie [1987] on this process of differentiation.) This aspect of stories has the challenging implication that narration is somehow intimately tied to our models of personhood and Self. The world of narration would make the connection between the real world and our inner world (our Ego?). Narratives provide us, rather than being mere reports, also perspectives, that help to *"give meaning"* to whatever happens to us (Bruner and Luciarello, 1989).

Memory schematization of narrative discourse

What sort of explanatory models are predicted by memorial schematization observed in real life and in the psychological laboratory? To make a long story short, several decades of experimentation came to the conclusion that our cognition is basically regulated here as well as in person perception, action interpretation, and many other areas of social psychology by *an anthropomorphic naive psychology about the causes of human action*. Complicated events of real life and the stories narrating them are made coherent and understandable by relying on a system of expectations using a model of human action.

Recall of narratives in this view is a selective and integrative reconstruction based on our action schemata. Narrative schemata are easy and they appear early in life, because they do rely on an early model of human intentional action which is supple-

136

mented by a perspective providing pattern of narration. Contemporary research on memory and psycholinguistics of texts attempted to provide a more explicit version of these schemata in several forms. The different models can be sorted into two types, *form-based and content-based models of narrative schematization*. Initially, due to the enthusiasm for the structural models discovered in Propp (1958), psychologists also looked for the sources of schemata in the text itself, following the "linguistic turn" of philosophy in psychology as well. Structural models proposed for a given corpus of texts by Propp (1958) were extended and rewritten as a generative system of rules able to produce an open and infinite set of stories. The most elaborate example was the grammar for Eskimo folktales proposed by Colby (1973). According to the processing application of this model by David Rumelhart (1975), recall would be directed by these rules. Basically, more embedded episodes would have a smaller chance to be recalled, and some types of grammatical nodes would have a higher chance to be recalled. Several models of story grammars were proposed following Rumelhart. Essentially, all of them treated stories as a series of embedded attempts trying to achieve a Goal, as the simplified higher-level structural rules indicate.

(1) Story   → Setting + Episode
(2) Episode → State   + Attempt
(3) Attempt → Plan   + Action   + Outcome

Two aspects are rather relevant for our concerns here. First, these seemingly formal (syntactic) rules are also based on the organizational principles of human action, as a careful reading of the "morphology" of Propp (1958) shows it. An action-based pragmatic-semantic model stands behind the apparent "syntax" of these models. What else does rule (3) represent than the fact that according to our folk psychology Actions are preceded by Intentions, and Actions are interpreted as successful or unsuccessful in relation to Intentions or Plans?

Beside this categorial analysis, some content-based models were also formed that reconsidered the seemingly "grammatical" relationships between events and actions in a narrative, as motivational relationships between "naive psychological categories". "Who Done What Why" is the organizing principle, as it was phrased most clearly in the Causal Chain model of Roger Schank (1975; Schank and Abelson, 1977).

All of these models received empirical support from experimental studies. "All" implies here that both types of models had a half dozen varieties in the heyday of story grammars. Grammar-like models received their psychological relevance from higher recall of structurally higher nodes and a better recall of Attempts than Plans or States. Regarding the content-based models, higher recall of the main causal chain was observed and also more recall of Causes in physical actions, and higher recall of reasons regarding interpersonal scripts (László, 1986). The real test came, however, when predictions of the different models were compared over the same experimental material. Black and Bower (1980) and Pléh (1987), showed, using multiple regression models for recall patterns based on the different story structure proposals, that the models which relied on the action system of the hero in assigning structure to the stories had a higher predictive power than the ones relying on a purely formal model. The kind of

narrative research based on this naive social psychology has been flourishing ever since. Graesser (1992; 1996) and Graesser and Clark (1986) even developed a special on-line questioning model to analyze how immediate is the construction of causal chains during reading texts.

These results of cognitive psychology imply that the key for the simplicity of simple stories, the special schema we looked for (the scheme that is so easy, appears so early in life, and is so much universal) should be looked for in the *naive psychology of human action.* In understanding stories, we mobilize our naive social psychology about the structure of human action and about the usual motives for action. Coherence is found by the hearer-reader through the projection of these motivated action schemata to the story. The specificity of traditional simple stories lies in the fact that due to the prototypical motivations in a given culture, and due to the simple transparent narrative point of view, this action organization can be revealed easily and unequivocally on the part of the understander (about this see László, 1986; Halász, László and Pléh, 1988).

There is a further question regarding the origins of these interpretation patterns. The initial questions regarding what gives pattern to simple stories find an answer in "naive social psychology". One has to somehow answer the upcoming question: where do patterns of naive social psychology originate from? Through its intimate connection with the issue about the origin of a "theory of mind" in humans, there are rival solutions here. One of them would basically state that some kind of intentional attribution is a modular feature of the human mind developing very early on (Gergely, Nádasdy, Csibra, and Bíró, 1995; Csibra and Gergely, 1998), while others would claim in their similarly non-essentialist approach that this naive theory develops as a result of experience with narrations (Bruner, 1985, 1990, 1996) – I should add, also carrying a strong social emphasis about the origin of our attributing schemata. Thus, a search for coherence underlies our schematization of stories, and this coherence is basically found by "turning on" our machinery of intentional attributions, and thereby reconstructing a causal chain that consists of causes and reasons that lead to these events. This is the view of the classical writer, too, as the Kundera motto above indicates.

The empirical research on remembering narratives, which seemed to be originally a rather "down-to-earth" empiricist project, through the seemingly innocent notion of "connected discourse" and "schemata" became tied to issues touching upon the "frame problem" of the entire enterprise of human cognition.

Narration as constructing coherence and the crisis of coherence

This is the point where the narrative frame issue becomes intimately tied to the crisis of modernity, and to the problem of the relations between the changes of narrative patterns and a crisis in our view of ourselves. In present-day intellectual contexts narrativity is entertained not only as a "low-level, down-to-earth" theory about actual narrations, but also as narrative metatheory. There is a remarkable basic similarity in the way narratives become central in experimental psychology, in the study of development and in the cultural and philosophical theorizing about the centrality of narration.

138

At the same time, new patterns of narration take shape. The extended narrative conceptions define themselves as contrasted to the *essentialism* of the classical view of man (about this opposition see Bruner, 1985, 1990). Essentialism in this regard is the belief in a postulated stable Ego as a starting point, and a stable world of objects. This is replaced by a world that is socially constructed through our narratives, and with a constructed Ego, rather than the Ego being a Cartesian starting point (Dennett, 1991).

The narrative philosophical interpretations take a special look at the mind and personhood. They attempt to construct a new vision of Consciousness and the Self on this basis. This line of thought sets off from the concept of dissolution and distribution. When it looks for metaphors of the mind, it compares the mind to the issue of integrating large empires, like the British Empire, where due to communication problems, things seem to be disintegrated, there is no real center. Human mind is likewise characterized by spatial and temporal disintegration or distribution. The narrative metaphor in this argumentation becomes an integrating tool. The disorganized events in our mind get organized through the mediation of stories we tell to ourselves. The unity of consciousness and self disappears as a first step, and comes back through the back door as narrative integration (Dennett, 1990, 1991a; Dennett and Kinsbourne, 1992). This type of metatheory is among the first ones to make a close connection between two sorts of "crises" regarding coherence going on within European culture. One is the crisis of narration, and the other is the crisis of the Self-concept.

In the 20th century, there were several waves of feelings to the effect that not only our outer world fell apart into pieces and became incoherent, but our internal world as well. We could start from a "once-upon-a-time arrangement", the harmony between the world of God, the stable Self and the stable patterns of Narration. This age is characterized by *transparency*. In the good old days of early modernity, Cartesian unity and transparency governed everywhere (Latour, 1993). The intentional stance (Dennett, 1987) could be taken regarding all the three realms that are of interest to us. The World was created by an intentional God (the argument from design), our internal world of experience was transparent to a self-conscious intentional agent, the Mind, Soul, Ego, or Self, and the Stories we wrote were also about intentional Heroes who carried clearly identifiable Plans. The whole world was to be characterized by stable intentional agents. (About this heritage and its multiple crises see Toulmin, 1990, and especially the volume edited by Dorothy Ross, 1994.)

The dissolution of this unity and the birth of a "distributed or deconstructed view" of the human mind was first proposed by the most courageous of the empiricists, David Hume:

> *What we call a mind, is nothing but a heap or collection of different perceptions, united together by certain relations … The mind is a kind of theater, where several perceptions successively make their appearance.*
> (Hume, 1739/1888, Vol 1., p. 436, p. 438)

He clearly realized that this vision had dreadful consequences for the notion of personal identity:

There are some philosophers who imagine we are every moment conscious of what we may call our self... For my part, when I enter most intimately into what I call myself, I always stumble on some particular perception or other, ... I never can catch myself at any time without a perception. ... And were all my perfections removed by death, and could I neither think, nor feel, nor see, nor love, nor hate after the dissolution my body, I should be entirely annihilated.
(ibid)

This attitude was never trivial to take. Following Hume, the questioning of unity and its reassertion came usually from rival ideological camps and therefore from different sources. As a bold generalization, one can claim that the proponents of disintegration were usually progressives who believed in the power of empiricist attitudes and science, by far not being pessimistic about their conclusions, and the trends reemphasizing unity were usually closer to church powers and to religious ideas about an immortal soul (Goldstein, 1994).

In the debates of nineteenth century on the issue of a substantial Self, there was a constant give-and-take between the "religious" and the "empiricist" critical theories (Carrithers, Collins, and Lukes 1985). The idea of a disunited Self came along several times during these debates. It showed up in the French empiricist epistemology of Condillac and others, and in the radical positivist views of people like Mach (1897, 1910). There was always a strong counter-reaction. In French intellectual life, the radical deconstruction proposed by the body image theories of Condillac were opposed by the mid-century school philosophy of Cousin that reinstated "Moi" as a starting point (see Goldstein, 1993). Seen in this context, the psychopathological ideas of Charcot and Janet about the dissolution of personality, as well as those of Freud at the other end of the continent were less radical proposals than seen at first sight: the contemporary and earlier empiricist deconstructions were much more radical in their intent.

The need for coherence

Our present intellectual world can be characterized by two types of dissolutions (or, if you prefer, crises). The first one is the dissolution of the stable Ego, which was already characteristic of the late 19th-century philosophy and psychology that became, with the words of the Hungarian philosopher Kristóf Nyíri (1992), "impressionistic" in its search for stable reference points. The same goes on in the most up-to-date *connectionist* approaches to the mind (McClelland and Rumelhart, 1986). Their emphasis is on a "nothing but" approach to the mind (knowledge is nothing but a pattern of activation in a neural network), and on overwhelming parallel processing and distributed representation all question the conventional Cartesian unity of the mind is still the best introduction to this radical connectionism. There is not too much space left in this for the Ego: it is in a way dissolved in the multiplicity of the parallel and in themselves meaningless multiplicity of computations and connections. Churchland (1995) gives a comprehensive radical interpretation for all of this, by stating that all aspects and issues of human inner mental life would in the long run be simply identified with neural models.

140

The other, parallel dissolution or disintegration went on in the realm of culture. One dominant aspect of this in the 19th century was a dissolution of traditional patterns of narration. There are interesting parallels here between artistic practice and philosophy. Kristóf Nyíri (1992) analyzed the affinities between the elementaristic theory of mind proposed by Ernst Mach (1897), and the school of impressionistic painting. The strong drive to liberate yourself from anything secondary, knowledge-based (top-down), anything schematic, and a search for undeniable, original certainty lead to pictorial and epistemological impressionism: the real raw stuff of both would consist of patch-like pieces of experience. There was, however, a similar trend in questioning the validity of traditional narrative schemata and the underlying naive application of the intentional stance as well. There are interesting parallels between giving up the idea of a causal chain in the outside social world of the novel, and questioning the presence of an integrative Ego in the inner world of the novel. (Kundera, 1986 gives an interesting survey along these lines.)

In the new types of narrations taking shape in the 20th century, the God-like image of an author with all encompassing knowledge is replaced by either a direct presentation of the inner world, or with a description of external behavior with no preassigned perspectives. Narration dominated by the intentional stance is replaced by a presentation of internal mosaics, like already in Proust or Joyce, or in the French *Nouveau Roman*, or in the theoreticians and practitioners of postmodern literatures. Among the later ones, Hassan (1987, 1990) tries to make a connection between new writing and the "deviations of the self". He lists the slogans about the dissolution of the Self that have a tragic connotation (divided Self, downgraded Self, dissolved Self, and so on), but after this exercise, he makes a postmodern turn. He arrives at the conclusion that by questioning the selves of the hero and the writer, and hereby by playing with the narrative point of view, new playful narrative structures may emerge.

With the birth of the modern novel in Proust, Joyce, and Musil, writers show that Kundera is right: they were experimenting with knowledge structures, and they prefigured a narrative concept of identity (including all of its crises) well before it was formulated as a theory of mind by philosophers.

The relationship between the issue of Self and narrative structures was already realized by some of the classics of narrative research in psychology, without relating them to the issue of literature. Frederic Bartlett (1935, p. 311) himself said:

> There may be a substantial Self, but this cannot be established by experiments on individual and social recall, or by any amount of reflection on the results of such experiments.

Samuel Beckett (1987) gives a similar interpretation of the importance of the multiple and non-conscious construction of the Self in Proust:

> But here, in that 'gouffre interdit à nos sondes' is stored the essence of ourselves, the best of our many selves and their concretions that simplists call the world. (Beckett, 1931, p. 31)

141

There are tragic, ambiguous, and ironical overtones as well in the literature regarding the dissolution of the Self. Both leave one central issue open, however. When we dissect the Self into elementary experiences and their relationships, and narration into narrative morsels, do we make them disappear by this very act? Does the Self really disappear, or do we only claim that compared to the primary stuff of experiences, it is only secondary? (That is the way, for example, how Beckett interprets Proust.) Does narration disappear, or is it only a secondary organization compared to the primary thread of discourse? Do we manage to radically eliminate coherence, which is usually accounted for by the Self and by narration, or we only make it secondary rather than using it as a starting point?

Narrative metatheory as a non-essentialist view of coherence takes the second option. Rather than postulating a substantial Self, the coherence of our internal world comes around by milder means, by storytelling.

The issue of coherence in communicative terms implies that the partners, A and B have to follow a mutual, joint model. They have to allow each other to reconstruct similar relationships between the individual propositions. This is referred to as the maxim of relevance by the communication model of Paul Grice (1975), and as the issue of higher-order models of intentionality by Dennett (1987).

Seen from this perspective, traditional *narrative schemata,* with their mobilization of intentional action interpreting modules are rather powerful coherence-building devices. One of the clearest aspects of the transformation of these in modern "high literature" concerns the changes in the comprehensive Plans of action from the point of view of the Hero and/or the Narrator. Its presence gives coherence to classical narratives, be it fairy tales (he wants to marry a king's daughter, sets out into the world, and through many obstacles gets her) or bourgeois novels (he comes to the big city, wants to make a career, relying on relatives and women reaches his goals). The comprehensive message of the literary work is tied to the intentional system of the hero. The final meaning (the life philosophy embedded in classical narration) of the work is the idea that there is a continuous, intelligible life, with initiatives of human Agents, who are full of Plans. These Plans give coherence of the man and of narration, as Kundera (1986) shows.

Of course, classical narration has many varieties, but they all share these underlying assumptions. Classical detective stories hide the plan that makes the events coherent, and it is the task of the reader, or Mr. Holmes to reveal them. But it is possible to reveal them because they do exist. Something different happens in modern literature, which spoils this "super plan", this goal system encompassing the entire novel. Kundera (1986) sensitively presents how this type of goal-coherence is ruined in the novels and realities of Franz Kafka. The hero is subjected to non-transparent Plans of others, and these Plans do not become clear even till the end of the story. The continuous goal system disappeared before Kafka as well. It was replaced by the world of inner experience in Joyce, and in Proust, as analyzed by Beckett, the action-based logic of narration and the actions of the hero are replaced by an undifferentiated network of experience, imagery, and souvenirs.

142

The identification of immediate with past experience, the recurrence of past action or reaction in the present, amounts to a participation between the ideal and the real, imagination and direct apprehension, symbol and substance. Such participation frees the essential reality that is denied to the contemplative as to the active life. What is common to present and past is more essential than either taken separately.
(Beckett, ibid, p. 74)

The whole work of Proust is not merely an essay on memory, but a practice in the relationship between unconstrained unintentional memory, and "voluntary memory", the "uniform memory of intelligence". "… [H]is entire book is a monument to involuntary memory and the epic of its action" (ibid, p. 34).

The comprehensive Plan disappears not only in the impressionistic presentation of the internal world but also on the level of behavior. In this third type of modern writing the external behavior is not characterized by clear Plans. Rather, things just happen to the hero, and he acts reactively, and tries to give meaning to the actions only afterwards. The continuous world of intentions is replaced not by an inner world of experience, but by the world of behavior. Think of some of the acts of Mersault in *The Stranger,* or to the beginning acts of Belmondo in *À bout de souffle*. The reader and the viewer are immediately presented by pieces of behavior, without enough preparation for the setting, and without a possible intentional interpretation. The individual experiences and acts are not presented as parts of an encompassing Plan. They can only be given a local interpretation. He shot the cop asking for his papers, but this happened so fast that neither he (the hero, Belmondo), nor we, the viewers had any chance to build up a plan to motivate the deed *(À bout de souffle)*. In a secondary way, we give interpretation to something that already happened. We make a story out of it like psychoanalysts, but the unique uninterpreted act preceded the story, while in classical narrative patterns, the starting point is the story with its intentional layout, and unique events fill the slots in a secondary way. Classical narration, while it certainly uses a narrative pattern, treats the pattern in an essentialist way, with a belief in the integrative Self, the events being only manifestations of this. This is in accordance with the top-down style of writing, and with the idea of an omnipotent and omniscient writer.

The key scene from *The Stranger* illustrates this lack of narrative build-up relying on intentions:

Then everything began to reel before my eyes, a fiery gust came from the sea, while the sky cracked in two, from end to end, and a great sheet of flame poured down through the rift. Every nerve in my body was a still spring, and my grip closed on the revolver. The trigger gave, and the smooth underbelly of the butt jogged my palm. And so, with that crisp, whipcrack sound, it all began.
(Camus, 1954, p. 76)

The murder by Meursault is rather different from that of Lafcadio in the *Caves of the Vatican* by Gide. His act is quoted as the classical example of *action gratuite.* This is an act of "no motive", however, only in the sense of bringing no utility to the actor.

Otherwise, Gide makes it sure that we see it as a planned, intentional, premeditated action. Lafcadio even laughs in advance how much trouble the police will have in dealing with a *crime sans motif,* with an unmotivated crime.

> *It's not so much about events that I'm curious, as about myself. There's many a man thinks he is capable of anything, who draws back when it comes to the point... What a gulf between the imagination and the deed! ... And no more right to take back one's move than at chess. Pooh! if one could foresee all the risk, there'd be no interest in the game!*
> (Gide, 1914/1953, p. 186)

Of course, there are plenty of more recent examples for the dissolution of intentional coherence. In this respect, Christine Brooke-Rose (1986) presented a rather interesting outline for the changes in writing so typical of modern (and of course postmodern) literature. First came the defocalization of the hero. That was already present in the nineteenth century. Think of the well-known comparisons regarding the Waterloo battlefield descriptions by Victor Hugo in *Les Misérables,* where you have an epic enumeration combined with a panoramic view and a clear presentation of the scenery, with the scene of Fabricio del Dongo being part of the great battle in Stendhal's *La Chartreuse de Parme* without really knowing it. The entire scene is defocused: we see the hero as being entirely out of the intentional plans of the agents, unaware of their plans, and even of them being agents. He does not even realize he is seeing the great man he came for. He is part of the battle without knowing he is there.

This is the defocusing of the intentional plans, indeed. But this was further combined with a defocusing of the "survival value" of the hero. Present-day heroes are no more close friends of ours, as Madame Bovary or Anna Karenina, or Rastignac, to that effect.

In the vision presented by Brooke-Rose (1993), the postmodern riot against character and stability actually eliminated anything that would contribute to the coherence, i.e., anaphoric and referential signs, and only the egocentric or deictic signs would work. There are, however, signs of hope (if you like) according to her. Character shall come back through the back door, through science fiction and stabilization of the postmodern ironical play with fictionality.

Coherence without subjects

The concept of communicative coherence allows us to look for inner coherence in a non-essentialist way and to avoid the usual pendulum-like shifts between disintegrated and essentialist views of the Self. The notion of coherence might be a help in finding some peace in the chaos of the world, without necessarily committing ourselves to another round of essentialism. The philosophical system proposed by Daniel Dennett (1987, 1991a, 1994, 1996) has some intellectual promise here, especially since he consciously connects the two types of dissolutions, that of the Self and of the narrative patterns. For postulating coherence, he does not need a hyposthasized subject. The coher-

ence of inner life (the Self, if you like) will be a "soft notion" for him, a "gravitational point" of all the stories we tell ourselves. For classical empiricist theories like Condillac and Mach, body image was the central source of coherence. Beside emphasizing our general tendency to attribute continuity to things we name, the other anchoring point is found by Mach in the concept of the body. Here Mach reiterates and modernizes an idea already apparent in the work of Condillac, and later on taken up by several theories, both in comparative and in clinical psychology (Henry Head, Frederick Bartlett) that take the body schema, the representation of our body as central to the Self concept. "As relatively permanent, is exhibited, further, that complex of memories, moods, and feelings, joined to a particular body (the human body), which is denominated the 'I' or 'Ego'" (Mach, 1897, p. 3).

This centrality of the notion of body image did not disappear in present-day discussions. It is certainly textbook material in psychology and it is seen in new neuropsychological theories as well. Antonio Damasio (1994), in his work on the representation of emotions and their role in the shaping of our goal system claims that the emotionally laden representation of our body is the central core to our Self concept. Dennett (1991a) in his view on consciousness also gives a central role to the body image in the reduction of our notion of the Self. However, his new original point is the use of the narrative metatheory.

Dennett basically claims for a soft and constructed theory of the Self that is even softer than the body image notion.

> *A self, according to my theory, is not any old mathematical point, but an abstraction defined by the myriads of attributions and interpretations (including self-attributions and self-interpretations) that have composed the biography of the living body whose Center of Narrative Gravity it is.*
> (Dennett, 1991a, pp. 426–427)

Without a narrative excursion, this very metaphor was already present in the philosophy of arithmetics proposed by Frege (1884), who already used the metaphor of soft notion, and the very image of gravitational points.

> *I distinguish what I call objective from what is handleable or spatial or real. The axis of the earth is objective, so is the center of gravity of the solar system, but I should not call them real in the way the earth is real.*
> (Frege, 1884/1950, p. 35)

Dennett is clearly aware of the ethical implications of a system based on soft notions. This issue was raised many times since the time of Hume, and it was indeed one of the main resources of the essentialist moralistic arguments (see Perry, 1985).

> *The task of constructing a self that can take responsibility is a major social and educational project… The only hope … is to come to understand, naturalistically, the ways in which brains grow self-representation …*

145

If you think of yourself as a center of narrative gravity, on the other hand, your existence depends on the persistence of that narrative (rather like the Thousand and One Arabian Nights, but all a single tale), which could theoretically survive infinitely many switches of medium … and stored indefinitely as sheer information.
(Dennett, ibid, pp. 429–430)

[Exegi monumentum aere perennius.]
(Horatius, Carm. III. 30, 1)

This is a conception, though with some ironical twist, similar to the one proposed by Sir Karl Popper (1972) about World III, namely that culture can in principle survive the destruction of its objective carriers. Here, the similar view is claimed for the relationship between bodies, programs, selves, and narrative constructions.

Dennett has his own ironies, of course, that you would expect from a constructionist theory. He quotes a novel mocking deconstructionism by David Lodge.

According to Robyn [she is the postmodern theorist] (or, more precisely, according to the writers who have influenced her thinking on these matters) there is no such thing as the "Self" *on which capitalism and the classic novel are founded – that is to say, a finite, unique soul or essence that constitutes a person's identity; there is only a subject position in an infinite web of discourses – the discourses of power, sex, family, religion, poetry, etc. And by the same token, there is no such thing as an author, that is to say one who originates a work of fiction* ex nihilo. *… As in the famous words of Jacques Derrida … "il n'y a pas de hors-texte", there is nothing outside the text. There are no origins, there is only production, and we produce our "selves" in language. Not "you are what you eat", but "you are what you speak",* or rather "you are what speaks you"*, is the axiomatic basis of Robyn's philosophy, which she would call, if required to give it a name, "semiotic materialism".*
(Lodge, 1988, p. 22)

In the view of Dennett, there is no internal agent in a Cartesian Theater who would make things coherent. Coherence comes as a relaxation point in forging intentional sequences out of the events coming to us. The use of the intentional stance is the macroscopic side of the constructing work of our brain. There is microscopic one, too, that is valid over shorter periods. Dennett and Kinsbourne (1992) apply the narrative metatheory to the order of millisecond as well to create a theory of consciousness. Essentially they claim that there are no central moments of consciousness. In our brain we are making Multiple Drafts of every incoming event (another narrative metaphor), and there is one of these that under normal circumstances is treated as being a conscious stage in information processing. But that delimitation is also a constructive and slightly artificial notion. For the same sequence of events, several "stories" are created. There is none being more basic than the others.

146

How can you reconcile this fragility with a theory that otherwise claims taking the intentional stance as basic? Dennett protects himself against this challenge, by allowing two different levels. You are entitled to use the intentional stance for the entire system, but not to its individual operations. But always remember, the application of the intentional stance is an evolutionary and economic hypothesis, which does not allow or require postulating real agents in the brain.

This is a two-level theory, like the one proposed by Bergson (1896) a century ago. The novelty of Dennett's theory is twofold. For him, the second level, the level providing us with meaning and coherence, does not require a disembodied mind. This level is set into a narrative and intentional model that in principle will have an evolutionary story to it (see Dennett, 1994, 1996).

But if Self and all these things are soft notions, why can we talk about their crisis? The evolutionary argumentation might argue for simplification. We have essentialized our stances for thousands of years using notions such as soul, Self, mind, etc. When we replace them with narrative constructions, we do not have to be so passionate as the traditional empiricists were. The skeptical seriousness of finding the emperor naked should or could be replaced by a lighter and more narrative attitude to this newest questioning of the Self as a starting point.

Dennett, of course, has his own critics. One of the most telling examples from the "neuro-essentialist camp" is Paul Churchland (1995, p. 266), who criticizes him sharply for reintroducing a linguistic type of model for human consciousness in his narrative model. Dennett, in his view, (1) pulls back the wrong prototype for cognition, namely language, then "(2) makes it the model for human consciousness, (3) gives parallel distributed processing a cursory pat on the back for being able to simulate a 'virtual instance' of the old linguistic prototype, and (4) deals with his theory's inability to account for consciousness in non-linguistic creatures by denying that they have anything like human consciousness at all". This criticism is rather misfired. Dennett (1987, 1994) always stands up for continuity in his speculations about the origins of human cognition. While he has a slight linguistic bias, this is not necessarily a disadvantage, if you consider us a speaking, and even storytelling species.

Psychoanalytic theory also phrased an interesting critic, not specifically directed against Dennett, but more generally against exclusively narrative approaches to the Self. Narrative metatheory is of course a driving force in some reinterpretations of psychoanalysis as well. Starting from Ricoeur (1965), an approach has taken shape that in the psychoanalytic discourse sees neither an unfolding of an internal essence, nor a symptom of some natural sequence of libidinal development, but a series of constructed narratives, and psychoanalysis is a joint reconstruction of a new narrative between the analysts and their clients. As appealing as this approach is with all of its hermeneutic overtones, it is interesting to consider what Arnold Modell (1993), himself a research-oriented psychoanalyst, thinks of it. In his view, the narrative approach can only reveal and touch upon the temporal aspect of the Self, the other aspect remains tied to the representation of the body itself. "The literary analogy cannot be followed very far, *because the coherence of the psychoanalytic narrative is ultimately derived from the bodily Self and its affectionate memories*" (Modell, 1993, p. 182).

THE HUNGARIAN HERITAGE

13. HUNGARIAN CONTRIBUTIONS
TO MODERN PSYCHOLOGY*

Traditions of history writing in psychology

I wish to claim in this chapter that psychology is not entirely neutralized and decontextualized as a science regarding its sociological background. Therefore, in analyzing its trends, there is something to be learned from its national characteristics beyond the mere fact of there being national differences.

The linear view: A caricature

The received or accepted tradition of historiography in psychology is one of *the linear traditions*. This conception is present in points of views emphasizing an unbroken and monocentric image of the unfolding of this young discipline. They assume several linearities.

(1) There is a clear development from psychology done in an unarticulated, speculative view on human nature, and especially on the mind and behavior contaminated by considerations of philosophy and even worst, religion, towards an end point, the implied goal, which is a solid and reliable view of the human mind based on disinterested natural science.

(2) According to this view, psychology as a modern science, as a profession, as well as a disciplinary subject taught at universities articulated itself starting from the world of academia "downward on". There is one center for modernization in this linear perspective: that of the leading universities and theoretical approaches. These may change like in changing from a mentalistic psychology to a behavioral one, but at any given period, there is only one center. The center may change nationally as well, like moving from Germany to the United States, but there still would only be one real center at a time. All the rest, like Russian-Soviet psychology, or Spanish language psychology with its peculiarities would be atavistic phenomena of the

151

periphery. Also, in any given cultural and temporal context, the academic world would be the dominant and the really interesting one.

(3) The received conception is also linear in the sense that it treats national features as belonging to the obscure, early and difficult times of the formation of the discipline. Psychology with its institutionalization would have basically lost all of its national characteristics. The development of psychology would be in harmony with political globalization. National trends belong to the past and would disappear with liberalization.

Questioning linearity

This line of thought is of course valid not only for psychology, but for traditional historiography of science at large. In order to prove an almost religious progress from obscurity to clarity, one had to assume this kind of unification. Present-day revisionist approaches, however, seriously question this attitude. The different networks in the life of the scientist (the intellectual network, the everyday private network, the political network, including the national aspects), as Bruno Latour (1993) claims it most clearly, are interwoven: they are competitive and sometimes cooperative determiners of the growth of science. Science should not be interpreted as the equivalent of a religious sacred realm that should not be tied to profane issues (Bloor, 1991).

In the conception of Latour (1993), the entire process of modernity is characterized by dualities. The basic one in fact is the duality between division and unification. Interestingly enough, both could support the neglect of national differences and the ideal of studying science in its pure essence. Certainly there is a shared presupposition behind the constant thriving of modernity towards *autonomy* of the different spheres of life, which results – using Latour's symbolic expression – in *great divides*. It started with the separation of state and church, between faith and knowledge on the intellectual side, and continued in the governmental separation of powers, to arrive in the nineteenth century to a *de facto* separation of intellectual activities (the separation of art, science, and philosophy being the clear-cut example, to be followed by the drawing of clear boundaries between sciences and humanities, between the different sciences, and so on). This continued into a further separation in "science studies" as well, and one vision of linearity and national neutrality was a consequence of this. The idea of "divide" supported the neopositivist notion of separating the *context of discovery* (ephemerous, disorganized, irrational and individual) from the context of verification (eternal, organized, rational and institutionalized) and a separation of the logical-structural versus the contingent aspects of scientific theories. (For a present clear critique of this division see Brown, 1989.)

The other governing feature of modernity, analyzed so powerfully by Toulmin (1990) is universalistic decontextualization, accompanied by its two sisters, depersonalization and disinterest (Shapin, 1996). These attitudes also clearly deny the continuous importance of any national peculiarities and entail a belief in a universal and algorithmic way of science making.

152

Today all of this bold belief in separations starts to really belong to the past. We begin to realize that separation and total autonomy are only ideals, and this is always supplemented by hybridization on all levels, which is the complementary process proposed by Latour (1993). This is true for the actual research process, as well as for its history. As Latour and Woolgar (1986) in their pathbreaking and rather controversial work describe "laboratory science", it is a process where data, internal determination and external issues (rivalry, cooperation, primacy issues, technical nets) are always interwoven – where "facts" behave according to their Latin etymology: they are "made" and not simply discovered.

The hybridization and network ideas of Latour (1993) propose that there is an interplay between the three basic contexts in the historical development of science as well. One is the intellectual context so dear to the proponents believing in an internalist approach to science, the other two being the personal and social aspects so dear to the proponents of an externalist view on science (see Shapin [1992] for a critical review of this opposition). The new, and more radical sociologism (incomparably more radical than the social view of science represented by Mannheim [1952 or Merton 1938, 1973]) is referred to as the *strong program* because it claims science to be strictly determined by social factors (Bloor, 1991).

This attitude presupposes all the three contexts, or networks, and claims that they are mixed networks in the history of the enterprise as well. If we take science to be a human undertaking rather than a divine longing for truth, that should be the state of the affairs. Ideas (the so-called internalist aspect) belong to the everyday social and personal net of the scientist, and they are the moving forces for larger social nets from journals and associations to founding agencies. Thus, they enter into the external aspect. Or, to start from the other way around, ideas and even experimental methods are formed under the impact of social and personal factors. Even the structure of the movement of science reflects this. The intersection and constant friction between autonomy (or in the words of Latour, *divide*) and *hybridization* is valid for the classical natural sciences as well. However, psychology's subject matter should make the historiographer more sensitive to this multiple embeddedness. This embedding implies the destruction of the classical linearity hypothesis: rival social worlds are present even today, and they were coexisting during the entire period of modernity.

What do historians of psychology do?

Let us move nearer to our specific issue and take a look at how unification and the problem of hybrids show up in histories of psychology. Most modern famous histories, starting from Boring (1950) and Murphy (1949), in several respects follow the tradition of the "modern great divides". They divide psychology into an *implicit* and an *explicit* period: one in which the separation of the (would-be) science from philosophy was not clearly made yet, and it had fuzzy outlines among many issues of general human knowledge, and one in which scientific issues and methods got their division from speculation and the like. Though they provide a few chapters on the implicit period, as Richards (1992) points out, in their treatment even of the implicit period, they

153

are rather parochial, due to seeing everything as a preparation for the great divide: only high-brow philosophy is of relevance to them. And due to this, they only see one kind of role hybridization in the emergence of psychology: that of the philosopher and the natural scientist.

This simplification has taken time. Earlier histories, like the ones written by Baldwin (1913) and Dessoir (1911) were much more generous regarding the impact of philosophy, and regarding the importance of other domains of knowledge, including even literature in the formation of psychology. When simplification was done, however, it resulted in a view where a clear divide was postulated between the prescientific and the scientific, on the one hand. On the other hand, there was a clear divide of what was treated as relevant from the prescientific period: only those pieces of knowledge that became integrated into the new discipline. This new discipline, to use the expressions introduced by Ben-David and Collins (1966) was a result of *a hybridization of the attitudes of two disciplines*: that of philosophical epistemology and experimental physiology. It tried to present a competitive advantage, by promising answers based on natural science to issues of philosophy.

Under the influence of Kuhn (1970), several attempts were made to interpret the history of our discipline as one where paradigms change rather rapidly. Thus there would be a sequence of Psychology of consciousness, Behaviorism, Cognitivism, and so on (Palermo, 1971). Some even more alternative voices claim a non-linearity by suggesting that psychology is a "multi-paradigmatic science", where different paradigms would coexist (Leahey, 1980). This would, of course, contradict the very notion of paradigm as introduced by Kuhn (1970). Therefore, still others claim that psychology is not organized around paradigms, but around prescription pairs or eternal dichotomies such as: objectivism-subjectivism, determinism-indeterminism, staticism-dynamism and the like (Watson, 1967).

All of this "loosening", however, does not really change the status of national differences. It seems to be a silent assumption to accept the image introduced by Boring. Boring's (1950) classic text shows how experimental psychology was born in Germany, England, and the United States as different centers, and suggests that after these nationally different birth processes the discipline has taken a cosmopolitan turn. Even the revisionist approaches of historiography stick to this image. By the example of Hungarian psychology I shall try to illustrate that on the contrary, taking a realistic sociological and historical attitude, one can find some meaning of the study of surviving national differences.

Traditions within Hungarian psychology

It would be too ambitious to show in a short chapter what the implications of a broader and non-linear view are for treating national elements in the history of psychology. I shall concentrate on the continuous *multiplicity of the approaches* and their close relation to each other, due to a small and therefore relatively transparent set of networks. A rather direct consequence of this is the other peculiarity of Hungarian psychology: the relatively limited intellectual narrow-mindedness which is a danger in contempo-

rary psychology. I suggest that both are features we should not feel inferior about and that should be preserved if we want our students to have as much impact in "world psychology" as they have now.

In the following, I will try to make a particular sense of the last hundred years of Hungarian psychology by trying to redress the received view of historiography and by urging for a more open and multifaceted view of the history and the present status of psychology.

Multiple hybridizations

Psychology, as Ben-David and Collins (1966) in their already referred- to paper clearly document, gained its autonomy both on the institutional and academic side as a result of a process of role hybridization. The social conditioning for the hybridization of the natural science background obtained in German medical schools with philosophical issues was the shortage of physiology chairs in the 1860s in Germany. Thus, a job tension was present for a generation of newly "habilitated" people on the one hand, and this coincided with a shortage of talented philosophers on the other hand. The birth of academic psychology was a lucky meeting of these two trends.

In my view, this is only part of the picture, however. This is certainly the dominant trend, the kind of "top-down" academic psychology which tries to move philosophical issues near to natural science, and then tries to campaign for disciplinary independence, chairs, labs, etc. While it is born out of a process of hybridization, due to its own academic interests, it soon turns into a self-conscious partisan and champion of autonomy. It remains conscientiously theoretical, in the first institutionalized primary centers, talks about "man in general", and avoids touchy mundane issues. (Wilhelm Wundt, the German founding father was, for example, as it is well-known, an open opponent of applied psychology.)

Another hybridization, however, went on parallel to this. This was a role hybridization between issues of the practical man and the naturalist biological approach to man. It was a meeting of the problems of the governor, the military man, the industrialist, the educator, i.e., the issues of society dealing with human life, and the developing evolutionary theory of organisms represented mainly by Darwin, on the other hand. As for its substance, this hybridization resulted in the formation of several functionalist psychologies, which were much less oriented towards disciplinary autonomy than towards practical success and application. As for its social aspect, this kind of psychology started to deal with development, individual differences, and pathology as well. It usually started off outside of academia proper, and when institutionalized, its institutions were practical social institutions rather than those of the academia.

The case of Hungarian psychology is interesting in this regard for several reasons. The most important aspect is that as things happened in Hungary, the early role hybridizations took place in parallel along three planes. The first one was the academic hybridization. However, it only partially followed the usual pattern in the early times, since it was nearer to the practice. Psychology was introduced to philosophy departments in the form of classes, then "seminars", which was something like a sub-

department, and the like. But during this process, many of the early Hungarian academic psychologists were less academic than some of the first German leaders. The second role hybridization was a special Central European version of the practical and functionalist hybridization: that of psychoanalysis and the different trends of depth psychology. That carried with it an emphasis on the well-known openings towards cultural studies, literary and artistic culture as well as medicine. The third hybridization was the practical institutionalization of psychology for education, dealing with retarded populations, and industrial selection. The latter attempts partly started from hygienic considerations of modern city life, and also from considerations of an educational reform connected to child-centered and sometimes radical social ideologies.

It is essential to keep in mind the parallel and interactive existence of all these three networks because there is a frequent peculiar and intellectually disadvantegeous treatment of them in the literature on Hungarian intellectual history. People who try to put psychology into the picture about their vision of the turn-of-century or between-the-wars Hungary usually take only psyhoanalysis as a point of reference. Some exceptions, such as Kende (1974) take notice of the other networks, mainly that of the educational reform movements, but also neglect academic psychology as such. This is not simply a one-sided selection. It is also a radical distortion of the *de facto* situation even of the extraacademic networks. For several decades, a real interesting aspect of Hungarian psychology was the close interaction between the different networks, or better, the fact that individuals participated in the different nets in a parallel way. Let me hint to two individualized cases of this. Ferenc (Franz) Alexander, the founder of psychoanalytically-minded psychosomatic medicine and an organizer of American and international psychoanalytic training was the son of the philosopher Bernát Alexander, and as he recounts in his partly autobiographical work (Alexander, 1960), he was influenced by the intensive academic and non-academic networks around his father and around turn-of-century Budapest at large. Or, to take another extreme, the experimental psychologist, Lajos (Ludwig) Kardos as he recalled in an interview, which was also common knowledge around town, while being a perceptual psychologist was at the same time in the 1930s a devoted discipline of Lipót Szondi (Pléh, 1995), as was, among others, Ferenc Mérei.

Hungarian psychology and the "Great World"

One can take three different perspectives on trying to relate Hungarian psychology to that of the world. One can talk of the stars who "made it", i.e., have contributed to world psychology, with world psychology knowing of this, and see if there are any specificities either to the internal aspect of their scientific work or to their background, i.e., regarding the external net in which their work was produced. Another possibility is to take a look at the work of people who followed important international trends, but remained unnoticed outside Hungary. They might be worth pointing out because they are part of the hidden train and trade of ideas. Finally, a third possible approach focuses on internal trends, to see if the local nets have any substantial messages about the structure and development of the discipline at large. I shall try to use a mixture of these possibilities.

The stars of Hungarian psychology and their impact

There are several quasi-established ways to identify who the real stars are in the history of psychology. One is the influence list compliled by Myers (1970), based on the citation statistics of 14 American professional journals between 1962 and 1967, analysing 7200 articles with 140 000 citations. Another one is the Boring list (Annin, Boring and Watson, 1968), based on the judgement of 9 eminent psychologists. Finally, the third is citation in the biographical dictionaries of Zusne (1975), based on Boring but extended towards modern times.

The following Hungarian names are to be found in the Zusne book. The numbers indicate how important the author is judged to be by the panel. The original scaling went from 0 to 27 points. György Békésy is included due to his Nobel Prize. The rest is rather meager. If we take strict criteria and only include those who made some of their professional activity as being related to Hungary we have: Paul Ranschburg (12), Géza Révész (23), and four psychoanalyticians: Ferenc Alexander (18), Sándor Ferenczi (19), Dezső (Dávid) Rapaport (21) and Géza Róheim (11).

I took the liberty of adding to this picture a few other authors from the academic tradition, where textbook or historical references support their international impact. I deliberately excluded living persons from my remarks.

The philosophical past

Three names stand out from the philosophical dawn of Hungarian psychology who, though they did not make it to the "big league" (the above mentioned impact lists), are still quoted in the special literature covering given topics.

Gyula Pikler (Julius under his German penname [1864–1937]), the left wing legal philosopher and organizer of modernist social science life *(Huszadik Század, Társadalomtudományi Társaság)* was also a reknown psychologist in the German-speaking world. His work (Pikler, 1908, 1917), which also appeared in Hungarian, made a serious contribution to the issues regarding the basic units and events of mental life. His synthetizing work (Pikler, 1917) tries to promote the principle of *negation in sensation* as a result of the active components of perception. It was intended to be a notion that would subsume all the already known "counterphenomena" in perceptual organization, such as contrasts, after-images and so on. But interestingly enough, and this is a continuous symptom, he is never really cited by the later generation of German-oriented Hungarian experimentalists, like Révész or Ranschburg. Even present-day historical summaries (Kiss, 1995b) ignore his substantial message, and only mention him with reference to an earlier review of Ranschburg (1942). This has a clear explanation: though he was socially in the right circles, he was not there intellectually: he did not try to make an intellectual niche out of his speculative contributions to modern psychology.

Jenő Posch (1859–1923) was both a rather interesting theoretical psychologist out-side academia and inadvertently became a *cause célèbre* on the intellectual political scene. He was criticized in the Parliament for his supposedly atheistic teaching of high-school students and even faced suspension as a teacher (Kende, 1974). His "objective psychology" that appeared in two bulky volumes at the beginning of the War (Posch, 1914/15) is an elaboration of Herbert Spencer's ideas about objective psychology in a direction of a motor theory of behavior. He basically takes over the idea of the adap-tive function of the mental from Spencer. But he elaborates it in a direction where most of our higher functions would originate somehow in motor organization. This is a rad-ical parallel to early motor theories of perception, such as the one proposed by the French Théodule Ribot, or the German-American Hugo Münstenberg (about these developments see Murphy, 1948). The radical element in Posch is that his elaborate motor theory of the mind was phrased in terms of adaptation rather than in terms of mental attitudes as was true of some of the early German motor theories. As a matter of fact, a modern historian of behaviorism treats the largely forgotten Posch as point-ing towards Watson and the radical motor theories of the mind (McGuigan, 1978).

Lajos Leopold (1879–1948) was an economist and early social theorist who had a surprisingly influential book in his time, *The Prestige*. It was translated into English (Leopold, 1913) and German. It was an early attempt to treat the entire problem of social influences on behavior and mental representation within a more general and more flexible framework than the imitation theories so popular at the time from Tarde through Le Bon and later G. H. Mead. "Prestige" for Leopold is a mediating represen-tational concept that is responsible for the spread of ideas, rather than simple imitation. Prestige involves and also helps to recreate social stratification (of this see the review of the English edition, Park [1915]). It is this aspect of his work that is parallel to soci-ological theories of Max Weber about social charisma (see on this E. Bártfai 1987).

Experimental tradition

The *heritage of Pál (Paul) Ranschburg* (1870–1945) is certainly the dominant element here. He is a key figure, not only with respect to the reputation of Hungarian experi-mental psychology (see already Schiller [1947a]), but also regarding our understand-ing of the overlapping networks in Hungarian psychology. While he was the founder of the experimental psychology tradition, due to his medical training, he made his early accomplishments in a clinical setting, and after being unable to settle there, he became the founding father of the introduction of modern psychology and especially experi-mental psychology into special education in Hungary.

He is interesting in our context for two reasons. One has to do with his internation-al fame. In 1902 Ranschburg, after working on hypnosis, published a paper on the dif-ficulty of recall of similar or homogeneous elements from a learning list. He used the then classic methods of memory research and even extended them with his own mnemometer apparatus (see Ranschburg [1912] for a comparative presentation of the sophisticated mechanical devices) over nonsense material. He observed a phenomenon

and gave it a name: homogenous inhibition. The phenomenon proved to be of overall import. It has become customary to refer to it as the *Ranschburg phenomenon*. It is much discussed and researched even in modern experimental psychology (for a review of its relevance see e.g., Marton [1971]).

His case is a very telling example of the importance of an identifiable effect not only in the history of ideas, but in the fate of individual achievements as well. If an effect is named after the person who discovered it (as is the case with the homogeneous inhibition concept introduced by Ranschburg in 1902), that might prove to be the royal road to "eternity". The name of Ranschburg appears in present-day discussions well beyond the range of the original effect and well beyond Hungary. His effect is called on as a possible explanation of new effects found in memory research (Fagot, 1995), and detailed discussions about the explanation of the original effect still go on (Greene, 1991). The important sociological point is that the early introduction of a reliable effect into an experimental science pays off.

The other important aspect of Ranschburg is his initiating a network of followers. Ranschburg was not literally the first to use methods of experimental psychology in Hungary. As a detailed report of Fodor and Kós (1995) shows, Károly Lechner (1850–1922), the first professor of psychiatry at Kolozsvár in Transylvania started to use reaction time measurements there in the 1890s. Lechner, however, used these methods only as part of his clinical practice and teaching: he did not try to get internationally accepted publications on the basis of his measurements. Ranschburg in 1912 also published a successful overall survey on the pathology of memory where he presented his experimental studies and contrasted them with the different approaches to pathology in neuropathology proper but even in psychopathology, including a detailed account of the Freudian theory of forgetting.

Ranschburg started his work at a medical institution. His situation at the turn-of-century Nervous Diseases Department lead by Károly Laufenauer is usually described in an idyllic way: experimental psychology makes a breakthrough in the medical school. The situation was much less idyllic, however. It was full of job tensions and fights for recognition. As Ágnes Torda (1995) reports in a philologically detailed account, the real history of the first Hungarian psychological laboratory and its proponent on the medical faculty had a hard time. The idea of giving lectures on "experimental psychology" and setting up a laboratory to study the mind was not welcome at all. The medical faculty committees at Budapest University repeatedly questioned even the titles of courses proposed by Ranschburg and the official affiliations referring to a "laboratory of psychophysiology" that the author used in his publications. Thus, there was suspicion, jealousy, and probably a bit of antisemitism as well. Was this, however, so much Hungarian, so much a characteristic of backwardness and being on the periphery? Definitely not. Cambridge (England) allowed a department of experimental psychology to be established only in 1947! Similarly, French experimental psychology mainly developed in medical and educational labs that did not become part of the established philosophical faculties. Sorbonne integrated a full scale laboratory of experimental psychology only after the second World War under the direction of Paul Fraisse. Jean Piaget thought it to be opportune to commemorate this event even in 1968 as a victory of facts over speculations.

Thus, one interesting implication of the life of Ranschburg regarding "the networks of science" was that his vicissitudes were not specifically the vicissitudes due to Hungarian backwardness. The other interesting aspect is the follow-up. This has more of local relevance to the first glance, but again it has some general messages. The psychophysiological laboratory set up within the special education system for retarded children first in Mosonyi Street in 1902 proved to be a very fruitful change with many consequences. Ranschburg (1923) did not lose his general ambitions in the new environment. His two-volume treaty is a worthy reading about the views of an established and serious neuroscientist on the human mind even today. It is an early synthetic attempt to "reconcile" experimental psychology with experimental and clinical neuroscience of the times.

It is remarkable that today two institutions, that of the psychological laboratory of the Training College for Special Education, and that of the Research Institute for Psychology of the Hungarian Academy of Sciences both see their founder in Ranschburg and trace back their activity to his laboratory. This is more than historic name-dropping on their part. It reflects the fact that the two fields of clinically applied psychology and experimental psychology indeed developed in overlapping networks in Hungary.

What was on the personal level an injustice towards Ranschburg (the slowdown of his process of habilitation at the medical school, and his being practically tossed out together with his lab from high-brow medical academia), carried a distinctive flavor towards the development of Hungarian psychology: a closer relationship between the academic and the applied nets, and a continuous special role for the Training College for Teachers of the Handicapped in the development of psychology that continued with e.g., Lipót Szondi and his students.

Géza Révész (1878–1955) is the other Hungarian experimentalist who has made it to the "international hall of fame". He belonged to the generation of young radical Budapest intellectuals who were ambitious in their science and open and outgoing to say the least in their political views (about this climate see Kende, 1974; János, 1982; Kovács, 1994; Harmat, 1995).

Révész, as an experimentalist established himself while still in Hungary. After obtaining a degree at a leading German university (that was typical at the time), he established himself as a leading expert in hearing (Révész, 1913, in English 1954b). His monograph assured his entry into textbooks, or into Boring's (1942) famous history book. He also established his other continuous topic: the study of early special talent. His study on Ervin Nyíregyházi (Révész, 1916) was among the first of its kind. In Holland, his fame was partly based on his decade-long study of touch (1938, English summary Révész, 1958) and his publications about the then-outmoded and questionable topics: the origin of language debates, and the relationship between language and thought. The wide reception of these latter books and volumes showed the need for a continuous study of these "forbidden topics" and assured a well-deserved fame for the author in his last years.

As for the institutional aspects, Révész managed to break into the world of the philosophical faculty and have a Department of Psychology established in Budapest during the revolutions following the First World War. This was a major breakthrough on the

level of institutions and networks, one of no lasting impact, however. In 1920, Révész had to leave the country for Holland and he established his international fame both as a scholar and as an organizer of European psychological life mainly through the first international journal of psychology, *Acta Psychologica*.

In Hungary, meanwhile, psychology itself, due to the political associations and connotations, became discredited in the world of high academia and in the world of earthly politics as well. It took a good decade to reestablish psychology at the universities, in Budapest by Pál Harkai Schiller, and at Szeged by Dezső Várkonyi Hildebrand.

Pál (Harkai) Schiller (1908–1949) seemed to be a largely forgotten author who was recalled into the Hungarian scene mainly through his philosophically-minded historical writings (Harkai, 1940) as an early critic of Cartesian dualism and proponent of a functional approach to the body-mind relation. Thanks to the efforts of Magda Marton in Hungary (see e.g. Marton, 1994) and Donald Dewsbury (1994, 1996) in the United States, the heritage of Harkai is no more a white spot on our maps of the intellectual past. Harkai Schiller was a fine experimentalist and a very erudite theoretician. In my interpretation, he tried to combine some of the best trends of the period between the two wars. From Kurt Lewin he took up the idea of the contextual determination of the motivating forces in human life (and characteristically applied it to the explanation of jokes: Schiller, 1938). Harkai Schiller had a general attraction towards a combination of Gestalt ideas, intentionality theory, and an "action theoretical approach" to complex behavioral phenomena (see Dewsbury, 1996). This is clearly shown together with his inspiration from the semiotic conception of the mind and the anti-Cartesian attitude regarding the body-mind issue proposed by Karl Bühler (1922, 1927, 1934, 1936) in his theoretical work (Harkai, 1940, 1944, Schiller, 1947b). But it took a concrete form in his numerous (partly posthumous) publications he prepared on what we would today call representational phenomena in animals: detour behavior (Schiller, 1948, 1949a, b, 1950), the drawing of chimpanzees (Schiller, 1951, 1952; Schiller and Hartmann, 1951). He is remembered today most of all as a fine comparative psychologist (Dewsbury, 1994). As Dewsbury (1996) reports, his impact in that field was interestingly the largest in the late 1970s, due to the advent of more cognitive approaches to learning and animal behavior.

As for the "networking aspect", two important moments should be emphasized in connection with Harkai Schiller. The first is that he was the first one able to make a stable breakthrough for experimental psychology at a philosophy faculty. In this process, some of his eclectic predecessors played a significant role. Especially Gyula Kornis, the prolific writer (his 1917 eclectic treaty on the mind is only one step in a long series of books on psychology) made many steps towards making the idea of experimental psychology acceptable after its ostracism. Harkai Schiller in a way belonged to a second generation. The members of this generation were not merely reading about experimental psychology but turned it into a working discipline in philosophical faculties. This was accompanied by a surprisingly non-aristocratic attitude regarding the role of academia on the part of Harkai Schiller. The theoretician and experimentally-minded Harkai Schiller at the same time participated in the formation of networks of professional guidance and selection, as well as the first national public

opinion survey center as Völgyesi (1995) documents it. This was another area where in the Hungarian case there was an interesting overlap between different networks.

Kardos Lajos (Ludwig, 1900–1985) was the doyen of Hungarian experimental psychology between 1947 and 1985. Internationally, mainly his early work done under Karl Bühler in Vienna and under the influence of Gestalt psychology is appreciated. His monograph on the role of shadows and brightness constancy in object perception (Kardos, 1934) is still a classic of the field. These are standard textbook materials in perception and in experimental psychology at large. He was one of the first perceptual psychologists to combine the attitudes of careful experimentation with that of courageous mathematical modeling. It is not surprising that decades later, he became an exponent of the application of cybernetic principles to psychology (Kardos, 1980). The other two aspects of his work, his later achievements, are less known abroad. In the 1950s, he tried to combine serious comparative psychology with the ideas of Pavlov (Kardos, 1960), a work that is of historical interest since it shows how a scientist tried to smuggle new ideas into an intellectually closed world. His works on animal memory (Kardos, 1988) and on the phylogenesis of mental life (Kardos, 1980) would deserve serious study. As a critical examiner of the behaviorist learning traditions, he developed ingenious techniques to study the organization of spatial memory in animals. His theory based on experimentation over three decades basically claims that animals have an image-like memory that stores things together with their localizations.

As for the networks aspect, Kardos had a difficult time. As soon as academic psychology in Budapest was established under his guidance in 1947, it became discredited for a good decade, and structurally it had to start everything from scratch in the 1960s. Kardos played a crucial role in defending principles and representing scientific quality during these difficult years. However, if we take a look at the sequence of Révész, Harkai Schiller and Kardos as three foremost experimentalists at the philosophy faculty in Budapest, their fates illustrate the most tragic element of the history of Hungarian psychology: politically motivated discontinuity. The thread of mentor to students relationships, the most active and most crucial element in establishing working paradigms in science was twice broken. The living continuity is missing, and therefore the organic development of the "craft aspect" of science was seriously impaired. That has the consequence of having a technically (on the skill level) much less articulated discipline than we would otherwise have. The multiple political "interventions" also had the consequence of *de facto* limiting rivalry, without any intention on the part of the participants. That has set up a combined set of detrimental attitudes: open discord and dissent should be limited because we (i.e., we psychologists) live in a basically hostile environment. As ugly as it may sound, as Joravsky (1989) pointed out regarding Russian-Soviet psychology, this is basically a Stalinist attitude towards science, even on the part of those who themselves are the most ardently anti-Stalinist. And this is an attitude that can hopefully be changed by real Western experience about the role of peer pressure and controversy in intellectual life.

György Békésy (1899–1972). The Nobel Prize winner physicist, who won the prize in medicine, made most of his outstanding experimental and modeling research while

162

still in Hungary (Békésy, 1928–29) and they were only summarized in his famous 1960 book. He was duly famous in the thirties. Boring took detailed account of Békésy already in 1942, and in the late thirties, scores of Americans visited him in Budapest (see the obituary of Newman, 1973 about this).

At the same time, he was rather unnoticed in the intellectual scene in Budapest. He got a professorship in 1939 at the Department of Physics in Budapest, but his work did not really get through to psychological circles. That implies an interesting barrier. It seems that while the academic, psychoanalytic, medical, and educational networks were transparent towards each other and there was quite a lot of communication both of ideas and people, there were boundaries between them and natural science *strictu sensu* at the same time. That is an interesting warning for today, too. Psychologists should keep their eyes more open towards hard natural sciences, not only towards their medical cousins.

The missing ones

There is another curious aspect to Hungarian-related experimental psychology. Beside the people who started their career here and made their impact from Hungary, and then left mainly for political reasons (Révész, Békésy, Harkai Schiller), there are the ones who are of Hungarian descent so to speak, but never had a working relation to Hungarian higher education, i.e., it would be rather generous to treat them as Hungarian psychologists. This could be said of Egon Brunswik, who was a student of Karl Bühler and later became a rather influential American psychologist, the first one to campaign for a psychology based on probabilistic ecological validity. The same could be said of the Gestaltist researcher of memory, George Katona who became a leader in the field of economic psychology in the United States. This trend, to be sure, never stopped: we have famous Hungarian-born young psychologists today as well, who have never had any contact with the universities at home: out of fear of being rejected, of all things. That is a constant warning: our institutes of higher learning should be more attractive and open.

Hungarian depth psychology

This is the area where the most interesting modern research is available both in Hungarian and in English. Informative and at the same time intellectually stimulating evaluative reviews on special topics, as Ferenczi and Hermann (Bertnard, 1993/94; Harmat, 1986, 1987; Nemes, 1988, 1990), as well as about the entire movement are provided by Harmat (1986, 1987, 1994, 1995), Déri (1990), Vajda (1995).

My intent is merely to point out again some of the basic characteristics that are incidentally highlighted usually by depth psychologists themselves. These are features that show the embeddedness of Hungarian psychoanalysis into the general issues of social science network formation in Hungary.

Social engagement of a mostly leftist nature is a dominant feature of Hungarian psychoanalysts from the work of Ferenczi on. That originally implied positive aspects, namely the social commitments of psychoanalysis to the causes of educational reform, to the cause of the poor, and so on. Later on, this social engagement, however, led to many negative experiences both due to the engagement of right-wing critics and due to the works of fellow leftist people. The social aspects of psychoanalysis were used as pretexts for its harsh ideological critic. (See Harmat, 1995 about this.)

Relations with natural science were very crucial to Hungarian psychoanalysts. The typical Hungarian way would not lead psychoanalysis into the realms of hermeneutics, but rather would try to ground it in natural science. This was true both on the substantive level and on the level of methodology. *Imre Hermann,* in his "clinging theory" (new edition: Hermann, 1984) tried to relate the psychoanalytic instinct concept to the ethological formation of the notion of instinct. This in a way antedates the work of people like Bowlby, who much later on attempted this kind of synthesis. That was true on the methodological level, too. Hermann's monograph (1929) on psychoanalysis as a method, which was by the way reviewed in its own time (Ruggles, 1929), related the technique of psychoanalysis not only to the general issues of introspective knowledge and experimental psychology, but also to the then very up-to-date notions of operational definitions (like the work of Bridgmann) in science and the like.

David (Dezső) Rapaport (1911–1960) in his doctoral dissertation in English (1974), originally published in 1939 in Hungarian language showed an early interest in trying to relate psychoanalytic dynamic concepts both to the history of ideas and to the contemporary schools of psychology. His main contribution to psychoanalysis later on during his American career was in a way a continuation of this Hungarian start. He widely published on the relationship between experimental and psychoanalytic theories of forgetting (Rapaport, 1942), on the analytic and laboratory studies of thought (1951), and later on, the conceptual analysis of psychoanalytic systems (Rapaport, 1959). He was a very interesting proponent of a biologically-based Freudian metapsychology.

All of this is rather interesting, not only from the point of view of the intellectual affinities, but through the relationship between networks. Hermann was an assistant to Révész, and Rapaport worked at the same time as a psychoanalyst and a student of Harkai Schiller in Budapest. He expresses his gratitude to Harkai Schiller even in his notable American reader on thought processes (Rapaport, 1951).

Another important feature of the Hungarian psychoanalysts is their early emphasis on Ego theory and early infancy. Déri (1990) even claims that the Hungarian depth psychologists were object-relations theorists decades before the term was coined in psychoanalytic literature. They all concentrated on the earliest dyadic, mother-child relationship, and on the traumatizing effects of its unsatisfactory nature and of its disruption. Zsuzsanna Vajda gives a clear account of this aspect, especially as it is relevant for education and the social vocation of psychoanalysis (1995).

The issue of networks once more

An interesting feature of Hungarian psychology is its reliance on rather elaborate networks. Due to the small number of relevant colleagues, for about 80 years "everybody knew everyone relevant" and that started to change only during the last two decades. On a day-to-day basis, this network-based world meant a few important things: professional relations were always personalized, creating closed circles and boundaries between them, but at the same time the work on the other side of the boundary was visible, with quite a few flip-overs. Most of the networks had their own "guru": the everyday professional activity of many of the important local figures, as well as of some of the internationally reknown ones was taking place in the circle of devoted disciples.

There were several important figures I will not deal with here in any depth, who exemplify the relevance of this factor from early on. This was true of László Nagy, the leader of the Hungarian child study (pedology) movement. But it was true on the whole for education-oriented psychology in general. Valéria Dienes (1914), the first promoter of a functionalist child psychology, and the later leader of the artistic dance program named *Orchestrica,* for example, always lived in different social nets and elaborated her Bergsonian psychology as part of these nets (Pléh, 1989). Similar things could be said of the distinctively Hungarian social psychology promoted by Sándor Karácsony (re-edition: 1985) as well: his entire theory mainly lived in an interactive field of followers and disciples.

Because of the small size of the networks, many that were non-partisan in their outlook were indeed open to others. Recently, Pál Völgyesy (1995) pointed out, for example, the many overlaps between academic psychology at the universities (e.g., Harkai Schiller in Budapest, Várkonyi Hildebrand at Szeged) and the vocational guidance activity and the psychotechnology connected with it. Similarly, both social psychologists, like the young Ferenc Mérei and educational innovators, like the senior László Nagy, then head of the Municipal Institute for Education in Budapest have all been involved in the guidance movement in the 1930s, out of a feeling of social responsibility and obligation.

Ferenc Mérei (1909–1985) was the archetypical network guru and at the same time the most internationally claimed author of the cult figures. His entire life was defined and fulfilled through the networks he not only belonged to, but brought to life. At the same time, his main scientific contributions also had to do with the issue of the relationship between the group and the individual, between good and bad networking from the perspective of democracy and individual happiness. His well-read paper that put him on the international scene originally was published in 1947 and in 1949 in English. The paper was included in the important social psychology readers for decades. Its essential point is that group interaction can create an "experiential surplus" that is different from the mere sum of the individual experiences. Later on, he developed these notions into several directions: elaborated the notion of "allusion" as a semiotic way to remind us of our group belongingness (see e.g., Mérei [1994] that also triggered a psychoanalytic interpretation of his personal journals; Virág, 1987) and also worked out a theory of the relationship between leaders and groups where efficient leaders always

take over the values of the group. (For a Hungarian summary of this work see Mérei, 1989.) Mérei's life and work later on can be seen as an exemplification of the implications of some of his early insights. His life was also a living witness for the intervention of politics in the life of the scholar and the other way around. As Erős (1995) has pointed out, the active political leader of educational reform of the 1940s, when fallen from grace and even put into prison, learned from his own example two important things for a Central European scholar. First, the shaky nature of life and power, the constant shift between inner and outer circles, which lead to a reflective consideration of the relationship between power and real human groups. A theory and practice followed that claimed a central place for spontaneity and for spontaneous group formation on the scientific level. Hence, the unprecedented and long-lasting influence of the ideas of sociometry in Hungarian social and educational psychology: the guru froze the methodology. Second, a *de facto* practice of unofficial groups followed, almost unofficial extra-academic universities, where togetherness, training, and the supportive value of group relations against the power structure of society was constantly reexperienced. Primary groups and their emotional aspects became for Mérei both the cementing factors of human life at large and the key to survival and protection of individual integrity against authoritarian officialdom.

The archetypical network man found a way for real human groups in a society that put all its official weight into the idea of organized and institutional socialization and group life. The originally left-oriented emphasis on the non-official spheres of life of the presocialist times became a theoretically motivated niche of natural groupings and leadership under official socialism.

Some national features of Hungarian psychology the world can learn about

There are some features of Hungarian psychology that are worth summarizing because they carry with them some non-trivial messages about the sociological determinants of psychology at large. Some of these are non-specific to our discipline but originate in the general cultural context.

Culture and politics related

Central organization and centrifugal factors. There is always an attempt to create a sort of an "official doctrine" and leadership along a Catholic tradition but the multiple identities, and the different role hybridization we surveyed always counteract this.

This creates a curious dialogue, however. Many times, the "alternatives" also wish to become the "officials" and do not always realize that their real interest is to fight against centralization, rather than to replace one center with another.
Discontinuity of tradition. Due to the multiple politically motivated cleansing and the self-initiated exiles, the normal master-to-pupil type of transmission of traditions was

166

disrupted several times during the hundred-year period. The cleanings were politically motivated but many times were new ways of continuing academic rivalry: politics was a new means to limit academic competition. Thanks to the nature of their trade, only the psychoanalysts escaped from this and managed to preserve a continuity. This is not an exaggeration. I reviewed the Hungarian psychological periodical literature between 1958 and 1975 (Pléh, 1979). In this vast literature there was no single reference to a non-living Hungarian psychologist! It is as if Binet or James would never be quoted by present-day French or American psychologists. Certainly, there are changes towards an increased historical consciousness. That, however, will never replace the missing immediate links.

This does not mean that Hungarian psychologists do not have role models in their disciplinary socialization. In the statistics we compiled of the solicited autobiographies of senior Hungarian psychologists (Pléh, Bodor, Lányi 1995), we found the following order of mention of Hungarian psychologists: Kardos, L., Mérei, F., Ferenczi, Szondi, L., (Harkai) Schiller, P., Radnai, B., Várkonyi, H., Gegesi. K. P., Herrmann, I., Grastyán, E., Karácsony, S.

This contradicts the image we obtain from the publications of the same people. It seems to be the case that it is a constant interest of the political winners to put the past into oblivion. Plus, psychology belongs to those sciences that in the impressionistic classification of Bourdieu (1984) are always cosmopolitan versus the national ones such as literature, linguistics and so on. This means not only that they are "gauchiste" but also that they are much more sensitive to the demands of politically motivated rewriting.

The role of informal networks was mentioned several times. I would merely like to reemphasize that they also are very important in training, in professional advance, and in the formation of professional "expert opinion".

Social science related

Some other features are related to social science in general in Hungary, or rather, in this part of Europe.

Responsibility. Psychology has a "vocation"-centered self-image: science should not be done for its own sake and professions are responsible not only for the individuals they deal with, but for the social good. In my view, this a clearly negative image several times. It led to prophetic visions of the possibilities of social science including psychology only to be thrown away entirely for the same social and politicized reasons.

The overemphasis on the social responsibility and common interest aspects of science carries its own dangers. It certainly is a peculiar competitive advantage in our region for those who want to avoid the harsh workings of the real moving force in science, as identified by Merton (1972): peer recognition. However, it discourages and drives away young scientists who seem to see it working only abroad, and it can slow

down the real intellectual unfolding of those who obey the calls to comply with the valuation of the political peer group rather than the tougher peer group of their colleagues.

Struggling for independence and impact

Social scientists and psychologists are many times trapped between these two needs: they want to be left alone, but at the same time they want to gain central support. This is a tension that is typical of the countries with a centralized educational system but its past can teach many things for colleagues who have to face these issues only now.

Disciplinary specifics

Closer relation between academic and applied fields. Possible combinations and shifts between the two.

Relative autonomy. Though I mentioned social pressures several times, they have to be understood in a balanced way. In the last three decades, psychology has obtained enough distance from most of the social pressures compared to other social sciences. It has become more autonomous than philosophy or sociology, unconsciously following the advice of Mérei of valuing more the little liberties than great prophetic promises.

Another message: It is important to keep the relationship between networks. As a matter of fact, this might be the key for future developments. But it is also important to remember the isolation, such as the sometimes self-elected secretive networks of the psychoanalysts, and also the separation of psychology from natural science, such as the non-recognition of Békésy, which carries a warning. This overlapping in such small networks should be wider and broader.

Scientists in Central Europe certainly have to face the hard decisions outlined by Barry Smith (1993) for philosophers: should they continue the national (local tradition) or become psychologist *à la* Stanford or MIT? The historian of psychology, however, should not obey the laws of cosmopolitan move. Regarding the history and the social conditions of the disciplines, the study of the "Magyar background" is and remains relevant even for a comparative science study. This is the sense in which the monocentric and linear image mentioned in the introduction is naturally compensated by the peculiar messages the detailed study of a given cultural context of a science provides us.

168

14. THE CATHOLIC TRADITION AT THE BEGINNINGS OF HUNGARIAN PSYCHOLOGY: HARKAI, DIENES, SCHÜTZ*

Varieties of "Catholic psychology" and the Hungarian scene

The aim of this chapter is neither a detailed analysis of the Catholic tradition of psychology in Hungary, nor a detailed analysis of how the works mentioned here are related to the integral history of Hungarian psychology. My point is that Hungarian researchers with a Catholic background or who were Catholic believers and joined the freshly started psychology movement of the first third of the twentieth century did not advocate a single version of a so-called "Catholic psychology", but approached the question of scientific psychology in different ways. I will only touch upon a few selected biographies here. The choices are not by random. The researchers selected, as well as their work represent a typical attitude, even in the context of international psychology. This paper also has a certain aim to popularize the Hungarian Catholic tradition of psychology, since it completely faded out of international consciousness. Such excellent surveys as that of Misiak and Stadt (1954) or Sexton and Misiak (1966) know nothing about us or the authors presented here.

At the beginnings of the twentieth century, one could find different varieties of Catholic writers and different interactions between psychology and Catholicism. These varieties were undoubtedly connected to the duality of reform and conservative movements within the Catholic church itself. One of these varieties of the relations between psychology and Catholicism is rooted in a certain fear of science; in particular, it is frightened by the fact that the human mind or "soul" can be a subject of scientific analysis and believers try to protect traditional mentalism – the concept of soul – and armchair philosophical psychology along with the misleading vision of category-based omniscience. All of this is self-promoted as a "reactionary move" against the scientific analysis and supposed materialist degradation of the human soul. This *fear reaction* was present in Hungarian psychology as well. The monograph of Gyula Kozáry (1898), for example, opposes traditions of the then recent past – scolded by positivism and reductionism – with substantial concepts of the soul, even in the last years of the 19th century. It is important to see, however, that along with this fear reaction, there were certain other attempts that essentially tried to revitalize a particular *veritas duplex*

in the common day practice of scientific thinking and human destiny: that is to bring science and belief into some kind of harmony – a science of the mind that relates to a crucial part of their belief, the soul. These attempts at non-radical modernization in a peculiar way worked without direct communication between science and belief. Gyula (Julius) Kornis, whom I do not deal with in detail here, was a characteristic representative of this trend. Kornis (1917), in his summary of psychology in 1300 pages did not even talk about the relationship between the problems of religious theses on the soul and modern analytic experimental psychology. No doubt, he was rather attracted towards *mental science (Geistwissenschaftliches) psychology,* in accordance with certain doctrines of the soul. However, while presenting experimental psychology, there is no public communication between his well-known Catholicism and a new, psychological attitude that questions traditional ideas.

Different Catholic attempts appeared within the framework of this modernization atmosphere – in international psychology at large, as well – to interpret modern psychology. There are three basic attempts that can be observed in contemporary European psychology, and all three are present in Hungary as well – that is exactly the point of my paper – and all three have an effect on psychology even today.

– Connections between modern functionalism and Aristotelian ideas. Many discover problems of the Cartesian tradition, and point out the similarities of a Tomist-Aristotelian attitude and modern functionalist psychology.
– Soft intentionality. The connection of *Denkpsychologie* (the theory of cognition of the Würtzburg school) and the program of modern psychology developed by Brentano (1874). The integrating moment is the idea that the definitive characteristics of mental phenomena are not to be looked for in their lack of bodily content, but in their reference to objects, these latter ones being either external or mental.
– Practical functionalism. Participation in educational reforms and the shaping of a child-centered education alternative.

The functionalism of Paul (Harkai) Schiller

The works of Harkai are not directly or strictly linked to the Catholic tradition of psychology. However, Harkai played a central role in Hungary by forming an early version of a theory that connected Aristotelian functionalism and experimental psychology. In this regard, one can consider his work a particular Catholic development, beyond the biographical fact that he formulated his ideas deeply embedded in Catholic spiritual and intellectual life. As the careful analysis of both Magda Marton (1998) and Dewsbury (1994a,b, 1996) clearly showed, Harkai was a groundbreaking researcher of an international status as well, in his attempts to connect comparative psychological thought with a semiotic and Gestalt-based notion of behavioral organization. This comprehensive attitude also appeared in his experimental works that were pivotal in the investigation of mammal and primate behavioral organization in issues such as the analysis of detour behavior, early signs of visual sign use in chimpanzees, Gestalt integration and the like (Schiller, 1950, 1951, 1952).

His one and a half decade long work in Hungary in a historical sense was crucial in establishing experimental psychology at the Faculty of Arts at Pázmány University in Budapest. (See Pléh, 1997 about this broader framework). This attitude tried to combine epistemological philosophical issues with the experimental methodology of natural sciences and is in line with one of the main hybridization movements underlying modern psychology (Ben-David and Collins, 1966). By establishing the experimental tradition at the faculty of arts, Harkai became the founder of a tradition of psychology in Hungary that until today has continued to be one of the most basic traditions.

Regarding the issue of Catholic traditions, there are two important features of his work. I emphasize them here without questioning his preeminence as an experimenter and his role in comparative psychology. The first peculiar feature of his work is an empirically and theoretically motivated renewal of Aristotelian functionalism. For Harkai, *The task of psychology* (1940/2002, modified German version Schiller, 1947b) is the problem of traditional Cartesian dualism, the postulation of a "multi-level man", a vision that supposes the reality of a mental world on the same abstraction level as physiological processes. Harkai juxtaposes with this image a view of biological man, which is in fact the renewal of an Aristotelian thought, by proposing that body and soul, physiology and psychology are not two different levels. Mental phenomena are a particular organization of human bodily or physiological processes. This curious functionalism links him in the history of Catholic psychology to the works of Mercier (1897/1925), a Belgian neotomist "modernizer", who – well aware of the facts of experimental psychology of the time – advocated the unity of body and mind. Mercier contrasted this view with that of Wundt who basically defended Cartesian dualism in a very curious modern setting. For Harkai, it was also pivotal that there is a continuity between Cartesian dualism and the ideas of Wundt (1903). In his theoretical work, he interprets the "heuristic principle of psychophysical parallelism", an important methodological doctrine for the followers of Wundt, as the continuation of ontological Cartesian dualism. According to Harkai, the main problem of Wundt – and this leads us beyond Aristotelian thoughts into a wider functionalist framework – is that he is unable to deal with the problem of "fields", popularized by Gestalt psychologists and other action-oriented theories of Harkai's time, the environmental forces that determine behavioral and mental processes. The organization of behavior should be interpreted as the interaction of the environment and a unified biological organismic entity. The motivational system of organisms only makes sense in an evolutionary background and cannot be interpreted merely as an interaction of experience and physiological processes.

This gives a curious flavor to the view of Harkai on the *unity of psychology*. For him, the key to unity is that one has to consider the actions in animal behavior, their motivational aspects, the direction of mental processes (their intentionality) and their unified organization. According to Harkai, the inspiration for this psychology should come from the followers of the intentionality tradition initiated by Brentano (1874). Another source is Karl Bühler (1927), talking about the semiotic unity of psychology, claiming that all human or animal action is characterized by a goal and at the same time it is guided by certain signals. All actions are goal-oriented, as the purposive behaviorism of Tolman (1932) claimed as well. At the same time, behavior has an objective

reference and is organized as a whole. This is what Bühler and Harkai thought to be the right attempt to overcome the contradictions of the fragments of contemporary psychology – motivation-centered psychoanalysis, cognition-centered experimenters and overt action-centered behaviorists should unite in a goal-centered holistic experimental psychology.

The work of Harkai was a modern attempt at a synthesis and it is proudly considered a valuable Hungarian tradition by the cognitive science community (see Pléh, 1998a). Its value is enhanced by the fact that it not only concentrates on experimental data, but also connects the renewal of Aristotelian functionalism with the attempts of a complex analysis of animal behavior. It is important to emphasize this because one part of the functionalism of cognitive science, machine functionalism that was started in the 1970s by Putnam (1960) and Fodor (1968) does not see quite so clearly the continuity between evolutionary functionalism (started at the end of the 19th century) and the new machine-based Aristotelian explanation. For some of the cognitive scientists, one important part of functionalism is computational liberalism: the belief that different kinds of organisms might have mental organizations and this is not to exclude machines either. They are not very interested in the problems so crucial for the European functionalist and American pragmatist tradition, such as the question of organizational levels of animal behavior, or the biological interpretation of individual differences. Harkai is expressedly a biological functionalist; in this sense, he seems to be a contemporary parallel to Gilbert Ryle (1949), many times labelled a philosophical behaviorist. Ryle, when analyzing the categorial errors of Cartesian dualism, tried to create a biological grounding of what we now call philosophy of the mind (of course at his time, due to the accepted behaviorist idiolect, this was not called so). Ryle was a lot softer and more open to the explanation of real biological processes than many of the hard cognitivists of today. Harkai belongs to this expressedly biologial functionalist view.

A practical functionalist Catholic writer: Valéria Dienes (1879–1978)

Valéria Dienes is a special outstanding star of Hungarian intellectual life, who is a crucial reference point to those researching Hungarian philosophy history, pedagogy, or Catholic intellectual life and spirituality, or even dance. I would only like to present here very superficially some well-known facts about her life. (For a short summary of her activities see Pléh, 1989, and for a German description from the website of a school named after her in her home town, Szekszárd, see the Dienes entry among the websites mentioned). She was the first woman to receive a Doctor of Philosophy degree at Péter Pázmány University in Budapest, moreover she got this in the areas of aesthetics and mathematics. During her long life, she was at the same time the propagator of functional educational ideas, a Hungarian expert on Bergson. She was both a disciple of Bergson's and an insightful Bergson translator. (For the latter see e.g., Bergson 1923, 1930, with extensive essays on Bergson by Dienes.) She was the one to start a unique

172

dance art movement, *orchestrics,* and in this way a disciple of Raymond Duncan or even perhaps his re-interpreter, and at the same time a Catholic interpreter to find the emotional value of dancing.

It is also a well-known fact – as she herself describes it (Dienes, 1983) – that in her early intellectual activities, she represented a rather straightforward positivist and materialist belief and joined radical social and philosophical movements. This was followed by several intellectual turns in her philosophy, and in her approach to life. Her first source for a change of mind towards a more idealistic view of life was Bergson, whose idealism had a great effect on her philosophical and psychological views in the first decade of twentieth century. A second intellectual change came after the turmoil of the revolutions after the First World War and in the midst of personal traumas as well. Dienes returned to Catholicism and from then on she continued her philosophical work in accordance with her Catholic faith.

From the point of view of the history of Hungarian psychology, there are two moments that are interesting in her extraordinarily career. The first one is her inspired interpretation of Bergson (see Pléh, 1989). In her works inspired by Bergson (Dienes, 1923), she emphasized the importance of constructive processes of mental life and she introduced the concept of "internal movement". For Dienes, Bergson is a special act philosopher, whose theory of remembering (Bergson, 1896, 1991) and later works propose that the mental world is not merely a passive summation of sensory elements; the main point of the mind is the internal integrative process, the peculiar meaning constructing activity that distinguishes us from helplessly passive beings. This is a crucial moment for Valéria Dienes, where one might find as a historian of psychology an intellectual connection between her Bergsonian ideas, her functionalist views and her later particular activist Catholicism. If we are to interpret her works from the point of view of Catholic tradition, according to her view, the affinity between Catholicism and modern psychology comes from the fact that they do not subscribe to the postulation of a passive mind and a passive organism.

The second interesting aspect for psychology in the work of Dienes was her involvement in a functionalist educational reform and its psychological underpinnings. With her translations (e.g., Binet, 1916) and with her involvement in reform schools, she helped the propagation of French educational functionalism in the beginnings of the 20th century in Hungary. As a translator of Binet (1916), she advocated the notion that the education of the child must spring from the interests and cognition of the child itself. The child, as a particular self-evolving system has to help the process of education and instruction should not merely be the infusion of ready-to-use knowledge systems into the mind of the child.

To understand the entire scale of her psychological ideas, it is worth having a look at one of her survey works. In 1914, she published a particularly interesting brochure in the Galilei booklets, a well-known progressive forum of left-wing thoughts. This is an original synthesis that presents both Ivan Pavlov and the Würzburg school of psychology of thought processes as the reformers of modern psychology. For Dienes, the key feature is the emphasis on hidden factors and functions. By hidden factors she means that our mental life shows a number of organisational systems that are not directly apparent, they are not transparent to the self-studying conscious mind.

Thinking is governed by hidden rules – advocates the Würtzburg School – which we cannot get to know directly, only via their products, their mental outcomes. Pavlov on the other hand claims according to Dienes that learning has certain automatic algorithms that are not directly transparent to consciousness either. In the survey of Valéria Dienes, all this suggests is a synthesis that presents psychology as the science of hidden organizing principles, where the emphasis is on organization. All of this was proposed before the onset of Gestalt psychological ideas.

Catholic dogma and modern psychology: Antal (Anton) Schütz (1880–1953)

While in Hungarian psychology Harkai represents the accommodation of experimental tradition at the faculty of arts and philosophy, and Dienes represents a functionalist tradition that is realized in educational movements, the uniqueness of Antal Schütz comes from his attempts to find practical relationships between Catholic belief and modern psychologist thoughts, a connection that Kornis, for example, leaves in the background. (For the life and activities of Schütz see his entry under the websites.) In his youth, beside his theological degrees Schütz obtained a doctoral degree in psychology in 1916 in Würzburg, with a research that followed contemporary cognitive experimental psychology, the Würzburg School. His dissertation was entitled *Zur Psychologie der bevorzugten Assoziation und des Denkens* (see Schütz, 1942). He was investigating the hidden tendencies determining associative recall. It is relevant to remind the reader of three basic ideas of the Würzburg school:

– Mental activities are guided by various non-image-like (unanschauliches) factors, such as attitudes.
– There are characteristic rules of individual cognition (thus logics is given a psychological interpretation).
– All these factors should be interpreted by implying that mental activity is always directed outwards, it is characterized by intentionality.

This tradition originating from Brentano makes it possible for Schütz to connect Catholic ideas with logic-based researches of the Würzburg School.

Schütz finds his place at the University of Budapest not as a psychologist, but as a professor of Catholic dogmatics, in line with his first degree. As for the relationship between science and faith, he represents the point of view that in the relationship of modern sciences (including psychology) and Catholic thought, one should not try to reach a sort of dual validity, but rather one should always be guided by principles of Catholic dogma, which always give us the right direction in scientific investigations of the mind. He tries to forge a unique alliance between Catholic dogma and a critical appraisal of contemporary psychology (Schütz, 1944). His critical analysis of contemporary psychology is the sort of criticism that appears at the end of the twentieth century in the criticism of Ricoeur, which is in fact a combination of hermeneutics and

Christian faith criticising today's neurobiology and psychology (see for example Changeux and Ricoeur, 2000), but it is recurrent in many non-professional and non-religious forms: for example it is still a leading ideological criticism of experimental psychology in the works of Ron Harré (1989).

Schütz goes beyond merely criticizing experimental psychology for its simple-mindedness. The work of Schütz represents quite well the special role of logical investigations in the Catholic psychological tradition – again, remember Brentano.

The main point of the psychological ideas of Schütz is that scientific psychology (and this is very characteristic of his later writings mostly of the 1930s and 1940s, see Schütz, 1941, 1944) has to be treated with great criticism. The solid basis of this criticism should be Catholic dogma, mostly a well-determined Tomistic interpretation of mental phenomena. This point of view has some messages for professional psychology as well. The main idea of Schütz – as it has been referred to before – is act theory of thinking asserting that the processes of thought – in accordance with the theory of the Würzburg School – cannot be regarded as mere sensory accumulation processes: the essential moment of thought comes from the subjects' particular computations or acts. This dynamics of act – in line with the interpretation of dogmatic principles – is the key for him to avoid reductionism, to avoid reducing the mind to its elementary processes.

Schütz in his later works (1944) – in those parts that are of concern to psychology – made interesting detours to the depths of ideological critics of psychology. He considers positivism and evolutionary theory as barren and factually untainable ideas. At the same time, he feels a curious attraction towards contemporary characterological movements. In one of his works, in his academic inauguration talk (Schütz, 1941), he tried to elaborate connections between schools or streams in logics and personality types of the representative researchers. In the same way as one can distinguish different types of thinking in people, one can distinguish different types of thought among scientific trends as well. Logical atomism, for example, is connected to a typical analytic personality, while wholism in logics is similar to an integrative or unit-forming personality. In fact, it is a personal world view that appears in the disguise of logical schools, through the filtering effects of personality. This rather original proposal is rooted in Schütz's attempt for a synthesis of Aristotelian category studies and the analysis of the categories used to describe personality. Both of his proposals (first the personalistic interpretation of logical streams and the Aristotelian personality study) fit into his ideological view. For Schütz, they supported his campaign against reductionistic psychology. In his view, only these synthetic ideas based on the integrity of personality will be able to create harmony between mind-guided Catholic ideas and modern psychology.

Summary

The presentation of these few Hungarian examples shows just the same conclusion as did the summary of Sexton and Misiak (1966): there is no unified and unique "Catholic psychology" as such. The different streams that are present in Catholic intellectual life

– both political and ideological streams – do find their place in the territory of Catholic psychology. According to this, in early Hungarian psychology, there are various Catholic works (or which can be categorized as Catholic) that try reach an agreement between Catholic modernization or the revision or emphasis of Catholic dogma and psychology. An important message behind these is the realization that there was not necessarily a contradiction between individual Catholic belief or even Catholic positions and the advocation of modern psychology or even the acceptance of experimental psychology. In these different alternatives, there are different personalities and values inside the Catholic group as well.

Yet there are certain common factors between conceptions that claim themselves to be Catholic. It is difficult to imagine a Catholic psychology that should be straightforwardly empirist and would believe in that mental functioning is no more than the accumulation of elementary sensory crumbs. Aristotelian functionalism also seems to be an underlying common intellectual principle of twentieth century Hungarian Catholic psychology: this sometimes appears as a program, other times only as a secondary supposition. The importance of integrative factors of mental life is also one of their crucial points – this appears as signal-gestalts in the work of Harkai and the integrating role of personality in the works of Schütz. Moreover, they all share the belief that we have to find unity both in the human personality and in the science of psychology, that should be a unified science. Another characteristic hidden principle – which is connected to the integrative idea – is the emphasis of act, the action part of mental processes and the supposition that mental life reaches beyond itself. This can be based on behavior, where one emphasizes the evolutionary idea of the continuity of human and animal behavior, as it happens in the works of Harkai, but it can also be based on Catholic dogmatics; in a hidden way the reference to *another of* thoughts themselves can be considered the psychological variety of religious transcendency, as it is in the works of Schütz.

15. THE DECLINE AND REBIRTH OF A SOCIAL SCIENCE: PSYCHOLOGY IN HUNGARY 1945–1970[*]

CSABA PLÉH, PÉTER BODOR, GUSZTÁV LÁNYI

The history of Hungarian psychology following the Second World War can clearly be divided into at least three, or four stages, as characterized by Putnoky (1970), Pataki (1977), Pléh (1979, 1984a, 1985b), Pléh and Lányi (1984). Each of these descriptions clearly admits that the overall situation of our science was conditioned by general political factors. The present chapter is an account of an ongoing project into the historical formation of present-day Hungarian psychology. The project that is supported by the National Science Foundation of Hungary aims at reconstructing the history of a *growing profession,* rather than merely a science.

Two types of data were collected: autobiographies were collected from Hungarian psychologists born before 1940. This meant mainly people who were socialized into the profession during the different stages of the variable postwar history. The other data source is archival research mainly from the archives of the leading university of the field and the Ministry of Education. The present account only uses data from the autobiographies and compares them to some earlier research into publication statistics in psychology.

The stages

(1) *The relative freedom and flourishment, 1945–1948*
   The years following the war were characterized by a presence of multiple approaches, the extension of practical work, all of this being conditioned by a relative political freedom.
(2) *Total oppression, 1949–1956*
   The open Stalinism of the 1950s was characterized by an ideologically conditioned ostracism of psychology: Subordination to Communist education, Pavlovization, accompanied by institutional reductions, both in training and in practical work.
(3) *Gradual recovery and professionalisation, 1958–1975*
   Following the tormented years after the 1956 revolution, when several (remaining) psychologists were imprisoned and banned from professional activity, in the years of "repressive tolerance", a rebirth of psychology characterized the general overall

changes of society and intellectual life. That was first a rather monolithic rebirth but it increased both scientific productivity, professional training and practical institutions (clinical settings, guidance centers, etc.).

(4) *Increasing professional differentiation and proliferation, from 1975 on*

This period is characterized by increasing Westernization, both in intellectual outlook and in the diversification of practical work, by a growing number of the profession – from a few dozens to start with in the early 1960s, to roughly two thousand today. This period is also characterized by an open renaissance of psychoanalysis in Hungary (about this see Harmat, 1990, 1994), a great amount of translations from Western literature and less and less ideology.

Figure 15.1. presents some supporting data for this periodisation 1945–1964.
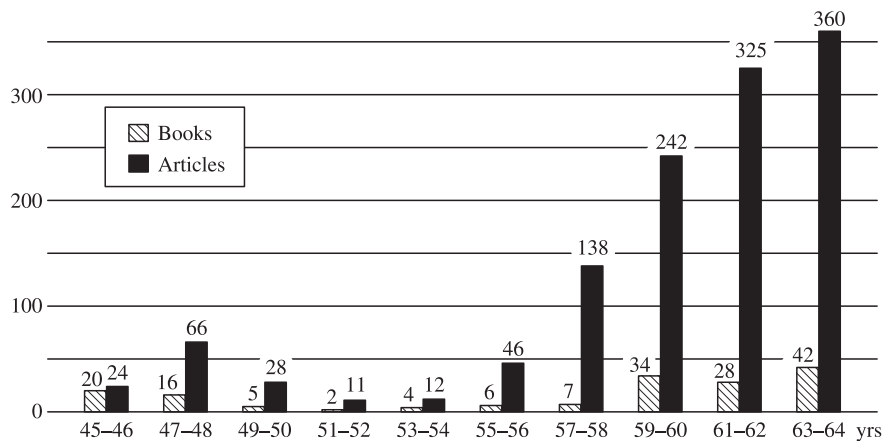
Figure 15.1. Psychological publications between 1945 and 1966
(after Pléh, 1979, based on the bibliography compiled by Benedek, 1967)

The overall increase of productivity characteristic from the early 1960s on was accompanied by an increased sophistication and by a gradual Americanization of the framework. **Table 15.1.** shows that the empirical papers gradually became more sophisticated. Papers with no bibliography decreased, and English took over the field as the major language background from the 1970s on. The decrease in the prevalence of Russian was also characteristic.

Professional reference points in quotations and in autobiographies

An interesting aspect of the autobiographies is the frequently mentioned names. Out of the autobiographies we made a simple tally of the frequency of names. This is remark-

Table 15.1. Increasing sophistication between 1958 and 1975
(after Pléh, 1979)

Years	1958–65	1966–70	1971–1975
Data presentation in empirical papers (%)			
No data given	36	20	10
Descriptive	55	41	39
Statistical tests	8	27	36
Higher level	1	12	15
References: Mean by articles			
Hungarian	2.9	4.5	3.8
Other	8.8	15.0	13.0
% of no reference	39	16	8
Language among the most quoted			
English	22	44	51
French	11	13	17
German	33	25	15
Russian	33	25	1

Table 15.2. The 10 most quoted foreign psychologists in different periods
and the 10 most referred ones in the autobiographies

1958–65		1966–70		1971–75		Autobiographies	
Rubinstein	71	Rubinstein	30	Rubinstein	30	Freud	56
Wallon	34	Leontiev	22	Piaget	26	Piaget	52
Pavlov	32	Piaget	21	Woodworth	17	Jung	18
Piaget	30	Lewin	14	Vigotskij	15	Leontiev	14
Sokolov	16	Bühler	11	Eysenck	14	Eysenck	12
Woodworth	15	Lurija	10	Leontiev	13	Rorschach	11
Claus	14	Vigotskij	10	Allport	12	Rubinstein	5
Menchinskaja	14	Bohm	8	Inhelder	11	Tjeplov	5
Bohm	13	Elkonin	8	Lomov	11	Bruner	4
Smirnov	13	Galperin	8	Bruner	10	Pavlov	4

able because we can compare this retrospective self-representation to actual quotations in different periods. **Table 15.2.** presents this with regard to the 10 most quoted and most frequently referred to foreign psychologists.

Among the most quoted authors, textbook references are very prevalent, like Rubinstein, Woodworth, Claus or Bohm. During the 15 years, there was a strong Russian presence (4 to 6 among the 10 most quoted in each period) with a content shift, however. Pavlov and his physiological school gradually lost its prevalence at the expense of the Vygotsky school (Vygotsky, Elkonin, Galperin, Leontiev, Lurija). Out of Westerners, Piaget is stable both through the references and through the autobiographies. Freud and Jung, however, who seemed to play a very significant intellectual role in the socialization of this generation, were underrepresented in the references.

Freud and some Freudians (Aichorn, Anzieu, Bowlby, R. Spitz) show up in the more extended list of psychologists quoted in 2% of the papers or more, but there is no sign of Jung and the Jungians, and Freud is much less visible than in the autobiographies. Thus, the comparison clearly brings out a difference in the self-representation in autobiographies and the social representations characteristic of the actual research work.

Out of the 10 most frequently alluded-to foreigners, only Leontiev is presented as an actual teacher and mentor. However, many of the Hungarian autobiographic references allude to important actual teacher-pupil relationships. Interestingly enough, in the publication survey, references were only made to then contemporary Hungarians, and they clearly showed overtones and idiosyncrasies of professional politics, thus they were not even included in the printed account (Pléh, 1979). In the autobiographies, however, most of the references are to already deceased mentors. **Table 15.3.** gives a list of the most frequent ones.

Out of the names mentioned, Lajos Kardos, Béla Radnai and Dezső Várkonyi Hildebrand were university professors. Kardos, the foremost experimental psychologist (vision and animal memory) was still an active teacher in the mid-seventies, while Béla Radnai, the educational psychologist died relatively young. They represented university presence of psychology in the humanities faculty in Budapest and were key figures of the development of those who started their psychology training in a semi-clandestine way in the 1950s. Thus, their prevalent role in this age group is self-evident. The same could be said about Dezső Várkonyi Hildebrand and Paul Schiller-Harkai. The latter was a very influential teacher of experimental psychology, who left Hungary in 1947 but some in the group surveyed still had a chance to learn with him. Dezső Várkonyi Hildebrand was both a very active publisher in educational psychology and an influential professor who brought into Hungary e.g., the ideas of Piaget. He still had some special classes during the 1950s (being over 60 then). Alexander Ferenczi and Imre Hermann are the signs of the living tradition of the Budapest School of psychoanalysis for many in our sample, as well as Lipót Szondi – in Switzerland most of this period – of a special Hungarian biologically-oriented depth psychology. Ferenc Mérei was both a very active educational psychologist in the 1940s and after his fall from power and even imprisonment a promoter of clinical psychology, social psychology and group therapy from the 1960s on. His high impact shows the importance not only of his personality, but that of extra-academic training and socialization centers. Endre Grastyán, the well-known neurophysiologist shows the constant importance of this area for some of the experimental psychologists in Hungary.

Paul Gegessi Kiss is a characteristic power figure of the 1960s. Being an excellent pediatrician and a leader of the academy, he did a lot for the reinstitutionalization of

Table 15.3. Most referred-to Hungarian psychologists and non-psychological figures in the autobiographies

Hungarian psychologists		Most referred-to non-psychologists	
Kardos, L.	96	Lenin	12
Mérei, F.	57	Füst, M.	9
Ferenczi, A.	50	Horányi, B	9
Szondi, L.	24	Makarenko	8
(Harkai) Schiller, P.	21	Stalin	7
Radnai, B.	21	Lukács, Gy.	6
Várkonyi, H. D.	16	Aczél, Gy.	4
Gegesi. K. P.	13	Bergson, H.	4
Grastyán, E.	10	Hegel, F.	4
Hermann, I.	9	Karácsony, S.	4

psychology though with his own "psychology" he became quite a controversial figure in the eyes of many.

Among the non-psychologists on the right side of the chart, the trivial political names just show how important the political situation and situatedness was to many in our group. This also holds for the name of György Aczél, a communist party leader of cultural policy for over 20 years who had a very great impact on personal decisions in psychology, even in the relatively liberalized period. György Lukács is not only valid as a philosopher and a politician, but as a professor at Eötvös Loránd University in Budapest during the 1950s. Along with Milán Füst, the well-known bourgeois intellectual writer, they represented esthetics, and their classes in the view of many had a great impact on the intellectual horizons of the new generation. Makarenko and Sándor Karácsony also deserve some comment. They represent the collectivist educational – and let us add, political – ideology of an entire generation. The Russian-Soviet ideologist of institutionalized education and the Hungarian national educational philosopher most active in the 1930s and 40s both believed in the superiority and primacy of community. They had an impact on the educational ideas of some modern psychologists but also on the way they later on interpreted Western-style social psychology as a science of the primacy of the group over the individual. That approach, by the way, was not alien to influential figures like Mérei either.

16. THE SYMBOLICS OF PSYCHOLOGY UNDER A TOTALITARIAN SYSTEM: THE CASE OF HUNGARY IN THE 1960S[*]

Social symbolics and social determination in science studies

In the recent articulation of the strong program in science studies, special attention is paid to the issue of the separability of the scientific content, on the one hand, and the symbolic role of scientific theories, on the other. Most of the proponents of the strong program (the Edinburgh program, if you like) take a rather clear stance here. Scientific content and social symbolism cannot be separated in the causal models of the development of science. Scientists are certainly looking for truth (which is itself a socially conditioned category in this view, but we can ignore this aspect for the moment), and they do this as full social beings. Scientists of the modern times participate in different networks. The intellectual network, the world of the "invisible colleges" is the most visible out of these, but the everyday private network (the personal life of the supposedly removed scholar), and the social network, including the political one are all penetrable to each other, as Bruno Latour (1993) claims it most clearly. The different networks are competitive and sometimes cooperative determiners of the growth of science.

There are certain trivial aspects of this social determination. Regarding the "socialist Europe", it is hard to forget a rather direct social determination.[**] Just think about the immediate power-related social determination of the fate of genetics, and for that matter, psychology as well. (Joravsky, 1989, gives a detailed account of these practices regarding psychology.) "Progressive" science that promised sudden and immediate changes, both in agriculture, and in peoples's mind, in education, was not only symbolically related to a political "voluntarism", but through direct political control as well.

To counterbalance the genuine science, an agricultural science of a different style was being created, one which cynically used the weapons of promise and deceit, an opportunistic science that accepted the paragraphs of countless decrees as axioms of its logical structure (Medvedev, 1969, p. 248).

[**] Incidentally, this "social determination" based on political directives and expectations makes it hard for Central and Eastern European scholars to deal without personal emotional involvement with the whole issue of social determination in science.

There are, however, less transparent determinations. Scientific theories with their symbolic aspects, but also with their directly claimed causal mechanisms enter the social world. They are cultivated and developed not merely for their merits, but due to this underlying determination, by interest. Let us take an example close enough to psychology. Steven Shapin (1975, 1979) in his studies on the fate of phrenology in Edinburgh society claims for a social explanation for the spread of the multiplicity view of the human mind. Not only were people different from each other in this view, but some of these important differences were also observable on the basis of external signs (of this semiotic aspect see Lanteri-Laura, 1970). This was a new discipline. We should not forget that prior to phrenology, there was no serious previous teaching about brain localization. The new discipline was cultivated by the new industrial and commercial classes of Edinburgh society, while the aristocracy together with official academia was motivated to claim a unified view of the mind, and therefore a unified vision of social power. Goldstein (1994) showed a similar distribution over a larger time scale. In nineteenth-century France, throughout the whole century, there was a tension between unified and multiple views of the mind according to his interpretation. The multiple views were of different varieties: empiricist (Condillac), phrenological (Gall), or based on the clinical evidence of dissociation as in Charcot, Ribot, and Janet. This vision of the mind corresponded to a multiplicity vision of the world, and in its civil variety of the architecture of the mind to a claim that there are many different types of excellence. These approaches were in constant tension and debate with the centralized government-related official philosophies that were lay versions of the view of the Catholic church regarding the soul, and symbolically, of centralized power.

According to the new strong proposals about the social determination of science, science should not be interpreted as the equivalent of a religious sacred realm that is not connected to profane and mundane issues (Bloor, 1991). It should be tied by its sociological study to its social background, and in this regard, not only an institutional history is in place, but a careful positioning of the theories and their social meaning as well, be them true or false from a later perspective (Shapin, 1992).

One can, of course, always raise the charge or challenge of hermeneutics here. It is questionable whether by showing the symbolic associations we really do uncover causal relations, which is the real intention of the strong program (Bloor, 1991) or do we merely reconstruct the workings of a semantic engine, i.e., the human mind that sees meaning, in this case social meaning, in all possible patterns. I sympathize with this latter view, with a serious restriction. We should not forget that not only are researcher who reconstruct the social interests behind a theory like hermeneuticians, but the actors themselves whom they characterize are also lay hermeneuticians. Therefore, in this symbolic domain, one should not expect a simple linear determination.

Take a trivial example. The social situation of the ethnically and linguistically divided Austro–Hungarian monarchy with the dissolution of the empire following the First World War can be interpreted, as this has been done many times (see e.g., Janik and Toulmin, 1973), as the social explanatory background for the different deconstructionist views, be it regarding the mind and personality (Mach and Freud), or novel writing (Musil), language (Wittgenstein), and the whole world. Fair enough. As Nyíri (1992)

184

pointed out, Austria can be seen as the first intellectual source and terrain of the "post-modern condition". But let us not forget that the same social setting was responsible for the flourishing of one of the strongest integrative attempts of modernity in the Vienna School, for theories that tried to reduce or model everything in a common language of a unified science. As a sensitive psychologist, one can of course claim that this unifying attempt was also related to the dissolution background. Certainly, as Toulmin (1990) indicates it for earlier versions of the unified views, for the Cartesianism of early modernity, unifying notions can be born due to the hopeless division and fragmentation of society, as a "compensatory reaction". (In the special case of early modernity, unifying conceptions appeared due to the devastation in the religious frictions in the Thirty Years' War). All of this shows the complexity of the symbolic-social determination. Humans are agents in their social field, they act in it, but within the given circumstances.[*] There are a series of consequences of this for the symbolic relations that interest us here. As a first step, the acts of the human agents do not have a meaning fixed forever: they have only contextual meaning. E.g., social progressivist movements tend to be tied to intellectual movements that question the dominant ideas in academia, whatever they be. Thus, there is no eternal social meaning to the different world views, their functional meaning depends on context. Second, the field does not simply determine the action of the people, but it motivates them. Therefore, what we can reconstruct in the best case is "only" this chain of motivation, and not a clear determination.

This long preparation sets the tone to look for some similar symbolic determinations in the unfolding of psychology in the 1960s of socialist Hungary.

Passive organism versus activity

Activity became a central issue in Central-Eastern Europe during the 1960s. As a matter of fact, a loosely-defined, fuzzy, "cloud-like" opposition set up between two approaches to behavior and mind. They corresponded to two views on human nature, and, in fact, to two views of social organization, as shown in **Table 16.1.**

The non-orthodox visions of human behavior were united in a feeling of looking for *more activity in humans.* In the debates characterizing active and passive views of perception, regarding the importance of instrumental and Pavlovian conditioning and the like, there was a hidden underlying social issue: namely the issue of how far we are as subjects of the Big Brother, indeed, merely instances of large-scale social laws, or we ourselves are agents, with intentions and an active self-determination. One could even say that open-minded psychologists were looking for more "agency". This latter issue, however, is a differentiating feature rather. "Agency" at the time also had an activist reform-Marxist connotation. Therefore, some professional psychologists were happy with the idea of activity, "agency" being too speculative and too Marxist for many of them.

[*] This is a hidden reference to Marx, by the way. "Men make their own history, but they do not make it just as they please; they do not make it under circumstances chosen by themselves, but under circumstances directly encountered, given, and transmitted from the past" (Marx, 1852/1963, p. 15).

185

Table 16.1. Some features of the opposition between two views on man in behavior science and social organization

	Fixed view	Dynamic, active view
Behavior science	Pavlovian conditioning passive sensation (mirror) one channel pathways learning and reflection	Instrumental learning active and motor perceptual models orientation and selection multiple pathways motivated learning
Corresponding social organization and philosophy	Top-down organization historical relativism individuals are passive subjects fixed rewards closed world	Bottom-up organization human nature as given individuals are active initiating agents changing rewards open world

Due to the underlying factors and the social symbolism associated with after three decades it is easier to understand some of the fierce oppositions and also the centrality and emotional interpretation of some ideas that would have been considered to be as "mere" scientific issues.

The case of conditioning

One of the most clearcut opposition was between *Pavlovian* and *instrumental learning* as summarized in **Table 16.2.** The good guys, of course, stood for instrumental learning. One factor in this was, of course, institutional. In Hungary, the Pavlovization of much of biology and psychology was a rather drastic and fast process in the 1950s, and the self-awakening psychologists in the sixties were reacting to that heritage. Pavlov was, so to say, the officialdom. Some of the experimental psychologists were trying to overcome it, or live with it by showing that it was possible to reconcile Pavlov with experimental (*horribile dictu*, American) psychology (Kardos, 1960). For the majority, however, a new road was open by emphasizing the importance of instrumental conditioning. Pavlovian conditioning had several features that predestined it to become "classical" conditioning. The very situation of the animal in the experimental setting is rather symbolic. Pavlov's dogs are constrained on the experimental podium. They are tied with scratches. The animal cannot move, typically its only possible action is to modify its salivation. (Or, to move its one untied leg.)

The instrumental learning situation is, of course, opposed to this on a trivial symbolic level, as Russian versus American. There is, however, a further, semantically richer symbolic opposition as well. The animal in a Skinner box seems to have much more initiative. "Cats in the puzzle box", to use Thorndike's expression (Thorndike, 1898), try several movements, and one is selected due to the consequences. Thus, in instrumental conditioning there is a role for chance.

186

In a way, the precursor of instrumental conditioning, trial-and-error learning corresponded to the constantly moving and pragmatic Darwinian image of man the new canonizers, like Rorty (1982) tried to revitalise as the pragmatic heritage of John Dewey (1910). Instrumental learning indeed corresponds to an "instrumental vision" of knowledge. And in the framework of this image, an active, crucial and not merely background role is played by motivation. Learning only happens if there is reinforcement. In some interpretations of the Pavlovian case, however, learning happens merely by contiguity. Again, there is a social implication that can be easily projected to this image: on one image, one needs to make people interested in what they do, in the other image, one does not need immediate rewards for any social activity. In the instrumental view of knowledge and in instrumental learning, you need direct motivation and also the self-initiated activity of the animal. **Table 16.2.** summarizes these contrasts.

Table 16.2. Some contrasts of the two views of learning

Classical conditioning	Instrumental conditioning
constrained animal	freely moving animal
learning by association	learning from consequences
motivation is not required	motivational is essential
role of chance is reduced	chance is essential

All of these features made for a strange position, a strange "ideological position" of *instrumental learning* in a strictly restrictive society. The same Skinnerian model of learning which became in the late 1960s the symbol of control, manipulation, and a lack of freedom, a deterministic view of man in American society, and in the high intellectual circles, a symbol of the overambitious reductionism of Skinner (Chomsky, 1959), in Eastern Europe *became a symbol for activity and freedom*, as contrasted to Pavlov's dogs who were merely subjected to interventions and were undergoing learning without doing too much. The small textbook by Barkóczi and Putnoky (1968), and the neurophysiological theory of reinforcement elaborated by Endre Grastyán from the early sixties on, and presented to broader audiences as well (Grastyán, 1967) were clear examples of this interpretation. The troubled fate of some Pavlov-followers in Russia, like Beritashvili, who dared to use more naturalistic settings with freely moving animals clearly shows that the symbolic aspect of the Pavlov orthodoxy was extremely strong (see Joravsky, 1989 for details). The symbolic side of experimentation there became a moving of social reality. Conditions in the sixties were not as trivial in Hungary. People were not persecuted for taking Skinner or Konorski seriously, but there certainly was a symbolic side to their preferences.

Perception and activity: The mirror revived

The same underlying issue, the role of activity, showed up in perceptual research and theory. Both in physiology and in philosophy (and of course, psychology), there was an implied or *de facto* passive view of perception that would take perception to be a mere information intake. This was the clearest example of the "mind as mirror of the world" image of modernity, criticized so sharply by Rorty (1979). One could even say that the combination in official ideology of the Leninist version of epistemology where the mind "mirrors the world" and Pavlovian physiology with the "two signaling systems" was a sad caricature of scientific modernity and its representational view of the mind. The social symbolics of this official image had to do with passivity again: mirrors and signals do not do too much, things happen to them.

In contrast to this official passive vision, *the good guys were claiming that perception was to be an active process*. There were several rival varieties of these claims even within Hungary. First of all, there were attempts within Marxist theory for a change towards a more active image of man, including a concept of "active mirroring". That meant, among other things, a return and a cultivation of the anthropology of the young Marx (Márkus, 1968a), and an in depth philosophical analysis of perceptual research from the point of view of "activity theory", social categorization in perception, and concepts coming from analytic philosophy (Márkus, 1968b). This was heretic enough for traditional "Leninist theories of mirroring", but was not appealing to all psychologists.

On the other end of the scale, experimental psychologists were mainly busy treating the motor components of perception as essential, and at the same time campaigned for some version of a template-based view of perception where perception would be infiltrated by background knowledge. Experimental programs were initiated by Zsolt Tánczos (for a late review, see Tánczos, 1984) for the explanation of the fine role of motor components in compensating retinal image distortions. The Innsbruck studies of Kohler belonged to the popular issues of the time. Motor theories were combined in this view with a Brunerian New Look approach. The emphasis on perceptual learning carried the implication of a nonrigid world that is not predetermined, neither by nature, nor by society.

The reader edited by Magda Marton (1975) was a clear and trendsetting example for this approach. At the same time, some other psychologists took up the "neomarxist" interpretations of the issue of activity and the Soviet work towards an active view of perception and human "agency" (Leontev, 1978). Again, a reader, this time edited by Ibolya Váriné-Szilágyi (1974) was a clear summary of this attitude.

The two lines were rivals in a sense due to some of their ideological connotations. The latter group thought that it would form a perceptual theory that is reconcilable with a view of man that treats man as more "active", more agent-like, in the sense of the early writings of Marx. The more experiment-oriented group thought, on the other hand, without spending too much time to spell it out dangerously, that psychology was an issue for the psychologists and should not be messed up with a reinterpretation of Marxism along more action-theoretic and activist lines. It should be the least possibly "infected" by philosophical considerations whatsoever. This should not be taken as an

aversion towards philosophy as such, but, rather as an experience-based attitude that showed that association with politically interpreted philosophies already led to later politically based professional discrimination in Hungarian psychology several times during this decade (about this see László and Pléh, 1992; Pléh, 1997). Though experimental psychologists had a symbolically motivated preference for an active view of the mind, they did not see any need to ally this to a reform Marxist orientation. For them, the battle for more "activity" in models of the subject was also a battle for more autonomy and independence of the whole field. In the official jargon of the time, that corresponded to the idea that *psychology was a "natural science", therefore not part of the "superstructure", therefore it is ideologically not sensitive to "class interests"* or the like.

Thus, for both directions anything that was "active" was supposed to be good and progressive by the psychologists. Notice that those were times when the ideological debates went on for a proper interpretation of "progress". "Progress" was not yet an unwelcome four-letter word. Everybody still believed in the idea of progress. But some thought progress entailed a more natural science view of man, with a deterministic flavor, while others thought progress entailed a more social, or even a more voluntaristic and undeterministic image of man.

Motivation

The issue of *curiosity, orientation reaction, cognitive motivation and spontaneous activity also played a crucial role in this self-definition of modern Hungarian psychology*. That appeared in several forms. In psychophysiology, Moruzzi and Magoun (1949) became the bible, and the most intensive research unfolded regarding the importance of activation in learning, their connection to sensory reinforcement, and relationship to play and self-initiated activity. The work of Endre Grastyán from the 1950s well into the 80s was the clearest example of this trend (Grastyán, 1961, 1985). Indeed, he was the first to propose a model about the role of hippocampus in learning through the regulation of orientation.

In human psychology as well, activation mechanisms were presented as crucial (Marton, 1964) and they were even put into the center of research on modern experimental typology (Marton and Urbán, 1965). The importance of "manipulative behavior" and the central role of self-based sort of actively searching cognitive motivation was also central to studies on infant development (Barkóczi, 1970). This was coupled with an emphasis on less restraint in infant education (the so called Lóczi method of institutional infant care). All of this implied a view of man where man is not only a passive information and knowledge intake unit under Prussian control, but is actively seeking knowledge and the truth. Elicited behavior was contrasted with spontaneity. Parallel to this, there was an emphasis on the role of non-homeostatic elements in motivation (Barkóczi and Putnoky, 1968; Grastyán, 1967, 1985). The underlying was again there: strict homeostatic mechanisms were equivalent to a closed world, while curiosity, activation and so on represented the idea of an open universe. Interestingly enough, there were frictions between neomarxist trends and the "naturalist" psychologists

regarding motivation as well. Ágnes Heller (1979) campaigned for a reduced role of "natural" moments in human emotions and motivation, and argued for a constructivist theory of motivation, not unlike the one proposed by Garai in a philosophical psychology inspired largely by the activity theory of the Vygotsky school (1969, 1993). Meanwhile, the "naturalists", referring to ethology for support argued for specific human instincts and a biological explanation of the non-homeostatic motivation systems.

Group organization

In the revival of social psychology in Hungary in the 1960s, there was a clear trend towards showing *the superiority of the spontaneous and emotion- or attraction-based groupings versus the formal ones*. This happened in a society where the official ideology paid an enormous amount of lip service to "communal organization" and to the idea of an abstract predominance of the social over the individual. The *de facto* society was based on strong hierarchies (forget about the egalitarian slogans). Societal organization was bureaucratic in the sense of being formal, not in the sense of being efficient. This was accompanied by an open emphasis on the importance of class, class interest and so on.

The good guys contrasted with this an emphasis on *spontaneous structures*. The sixties were the prime time of sociometric research and activism in Hungary. The clear implication being that primary groups should be based on real affinity and as Ferenc Mérei's (1989) extensions of Moreno showed, on efficiency- or competence-based organization, rather than the official one. There was a constant undertone suggesting that official groupings were simply bad. The officialdom was inefficient in selecting leaders: we are in fact the alternative, the "real leaders". That is what any vote, be it a sociometric vote, would show. Thus sociometry in a way was a substitute for politics: it implied an organization outside politics, but at the same time it was based on *voting and choice* that did not really exist in Hungarian official politics at all. With its emphasis on emotionality, on immediate social power, and on choice, sociometry had a hidden threatening message. Even more threatening than the mere idea of social engineering was. Remember that the communist credo in its early forms had a clear social engineering commitment.

Another central feature of early Hungarian social psychology is the constant emphasis on *anti-authoritarian attitudes* and on *the importance of democratic group leadership*. While the Lewin- and Adorno-inspired and -mediated notions retained their original antifascist meaning, at the same time they transmitted a more general anti-authoritarianism (about this see Erős, 1979). I.e., they carried an implication (though openly not spelled out, but tacitly assumed) that our own society also showed signs of the illness of authoritarianism, and cannot really face democratic leadership practices on any level.

Motherhood and the state

The seemingly absolutely innocent issue of mother-child relationship was also not an easy and trivial one. Comparative psychologists like Magda Marton and Ilona Barkóczi, as well as developmentalists in textbooks (Mérei and Binét, 1970), psychoanalysts dealing with attachment problems, and even the openly not psychoanalytic case study literature constantly reemphasized *the importance of motherhood and maternal love in infant development.* One has to understand the symbolic undertones of this, again, not in the context say of present-day American feminism, but in the Hungary of the fifties and sixties. One of the "party lines" suggested an idealized version of Makarenko-based communal education. It suggested that as a matter of fact, it is the state that has to care about children, in all levels of their development. The state should thereby, of course, have control over the moral development of children. This way, one of the great issues of educational publicity at the time, "double education" (home being religious, school being materialistic-atheistic) would be overcome.

Seen from this perspective, reemphasizing maternal roles, and the arguments pulled for it from research on hospitalism and the Harlows, was not a return to traditional role models. Rather it was an attempt to use the cultivation of scientific facts to protect children's rights against attempted organized hospitalization. To phrase it anachronistically, it was an early children's right movement.

The issue of knowledge and truth

There is an interesting underlying problem all over Central and Eastern European intellectual history in the times after Khrushchev. Scientists always believed that they were standing on the right side, in the sense that they were on the side of *real progress.* Society and power might have biased the notion of progress, but there was a belief in real progress. For science, this implied that there would be more freedom of research, and a clear stance against obscurantism. Truth will be victorious. Truth cannot be oppressed in the long run, and there is an affinity between reformist social changes and the truth as delivered by science itself. In the context of the time belief in "positivistic truth", as hard as it may by to accept it now, was an act of moral and intellectual revolt, and not a comfortable stance. It would of course be very difficult not to believe in the objectivity of the truth in a social organization where you constantly experience not the unconscious but the planned and manipulative distortion of truth.

Present-day hermeneutically based relativistic views on truth challenge this Enlightenment version of belief in progress in the former socialist part of Europe, as well as in the "educated West". Both the scientist and the hermeneutician believe in the need to increase human freedom. But they diverge in the fact that the hermeneutician would extend his flight for freedom towards a total freedom of interpretation as well. In this view, it would be an unfounded reification to believe in the objectivity of truth. Truth itself is a construction. The scientist, on the other hand, believes that his freedom of interpretation is constrained. He fights society in the very name of these constraints

on freedom, while the hermeneutician challenges the notion of truth in the name of the freedom as well.

A version of these different revolts against authority was true for the non-existing dialogue between neo-Marxists and experimental scientists. Both groups were looking for more freedom, but each one suspected the other in compromising freedom for new constraints. The data-oriented social and behavioral scientist was supposed to be too much involved in building a deterministic image of man which would counterbalance the socially deterministic but at the same time factually voluntaristic official view. The neo-Marxist at the same time overemphasized the "constructed character" of social life and social determination. In the eyes of the scientist working in the direction of providing an intellectual sanctuary from the voluntaristic politics at the top, this latter one seemed to be a rather threatening perspective.

One can only hope that in the politically clearer perspectives of today, a more open dialogue will develop between the naturalist and the constructive images of man, and small intellectual communities like the one existing in Hungary can even become interested in these dialogues.

192

MODERN MIND, COGNITIVE ARCHITECTURES
AND THE COMPUTER CHALLENGE

17. COMPUTERS AND PERSONALITY*

Basic proposals

This chapter delivers some simple proposals regarding possible relationships between computers and personality. Since my presentation will basically be rather circular, I may as well summarize these proposals here.

(1) Computers are not radically new elements in the history of human thought. They fit into the continuity of machine-based thinking at large.
(2) Their novelty is the foregrounding of informational aspects even regarding our self-image.
(3) Therefore, they force us to reconsider several of our intellectual traditions, issues like literacy, mind-body relations, hominid evolution, the independence of the mental domain, and the like.
(4) Computers are factors of a "rapprochement" between the "two cultures", the supposedly separated human and scientific cultures as proposed by C. P. Snow (1963), rather than – as they are usually treated – threats toward the human world. They are fermenting a new dialogue between engineering, scientific, philosophical and humanistic issues.
(5) They provide for a relatively new, soft and more hypothetical approach to personality and personhood.

Modernization, machines and humans

My approach takes as a starting point the ironical interpretation of modernity and modernization represented during the last decades by Bruno Latour (1993). Latour tries to overcome two conceptions. The first one is the idea of a victorious march of modernity, the other is the image of a postmodern self-destruction. In his view, both are mis-

taken. The Enlightenment considers modernity as a one-dimensional victorious march that constitutes victory over darkness and ignorance by detaching "higher" from "lower" in repeated cyclic series of conceptualizations to subsume everything under the governance of the "higher", following a logic of dominance. Reason is detached from passion (as it was already proposed by Cartesian ethics), belief is detached from knowledge, as church is from state. Modernization detaches science from mundane reality that is most clearly represented in the Marxist view on "forms of consciousness" in the work of Lukács (1964), for example. According to this view, nature is clearly separated from society.

As a second step, and this is the aspect that is so familiar from the Enlightenment critic of the Frankfurt school (Adorno and Horkheimer, 1969), separation is followed by establishing dominance relations. The world at large is subjected to the power of Man the Planner, emotions are subjected to reason, belief is ridiculed compared to knowledge, and everyday life looked down in the name of science. On the other hand, on the side of aspects, determinism and necessity discovered by science are separated and contrasted with liberty so essential to the self-definition of individuality, and in the entire individual starting point of modernity. All of this was accompanied with a definite belief in the victory of the "good side", in the victory of progress, or, to put it more critically, the belief in the moral and practical foundations in the dominance of the stronger side: reason, science, lawfulness, and naturalness will overcome; prejudice shall be replaced by the power of positive knowledge, which will contribute and lead to a unified and Monolithic world view, following e.g., the scientific credo.

All of these dualities in and by themselves present a (seemingly) interior paradox. Divisions lead to a victory of one of the poles, and synthesis would only follow after hard analytic steps. This is by far not a necessary contradiction, however. Analysis might be treated merely as a method, as a tradition of an analytic way of thought, which is not accompanied of necessity by a resignation from synthesis, as pointedly noted in his analysis of Sellars (1963) by Kristóf Nyíri (1992).

According to the postmodern view, however, the entire image is no more valid as of today. The requirement for a "pluralistic universe" announced a century ago by William James (1909) grew its fruits by today. One has to postulate many ways of thought, with no hierarchy and sometimes even no dialogue between them. We should allow for a multiplicity of thought following a tolerance in human relations.

In the view of Latour, both visions are misleading. Modernization is not a process with a single pole. It is not a victorious march on a self-made trail through the forest, from darkness to light. As the panorama on the history of science provided by Michel Serres (1989) attempts to show, modernization took place in the context of more specific bifurcations even in the history of science, just to make place for a reunification of the previously separated agents. According to this cyclic view, even postmodern deconstruction holds only in a temporal manner. And whatever holds from it should not support a new anxiety. One has to take over the drive, the ambition, and the need for a system out of modernity, but one has to forget the hope for a single, exclusive rationality, as summarized in **Table 17.1.**

Latour identifies three directions on the contemporary scene that would prefer to destroy something held to be extremely important. Sociobiology would prefer to "anni-

Table 17.1. Latour's view on the trilogy of pre- and postmodernity (Latour, 1993, p. 135)

	What should be preserved	What is rejected
From modernity	– long networks – size – experimentation – relative universals – final separation between objective reality and free society	– a nature–society dichotomy – secrecy in mediating knowledge – Great Exterior Divide – sour criticism – universality and rationality
From the premodernity	– unity of signs and things – transcendence – multiplication of non-human beings – temporality through intensity	– obligatory ties between nature and society – scapegoating – ethnocentrism – territoriality – limited scales
From postmodernism	– multiple time – constructionism – reflexivity – denaturalisation	– belief in modernity – critical deconstruction – ironical reflexivity – anachronisms

hilate", to intellectually reduce society as such. Latour refers to Wilson (1975), but one could as well broaden the horizon and talk about some trends in neurobiology and ethology as reductive trends regarding the poles of modernity like nature and soul. Radical sociologism, on the other hand, would end with the person. Latour refers to Bourdieu (1992) here. One could again look, of course, further. The elimination of the person, its dissolution into the web of the social world is not merely a trivial Marxist and Stalinist hope, but a well-known French tradition as well that showed up early in this century in the Durkheimian French sociological radicalism. Halbwachs (1925) considers the process of remembering in a way where individual minds are only tools for the survival of social representations. If one want to rephrase this view in an idiom *à la* Dawkins (1976, 1995) one could consider individual mental knowledge packages to be tools for the existence and survival of memes as social representations. The "real mental entity" would be collective consciousness, social representation. The individual would disappear, and the biological individuum would only be a system of realization for social moments. "We could say that the individual remembers from the point of view of the group, while the memory of the group would be realized and manifested through individual memories" (Halbwachs, 1925, VIII).

The third, most radical deconstructionist view goes even beyond eliminativism: it does not provide any kind of reduction, rather, it merely eliminates what was there as a unity. Latour, of course, has in mind the conception of Derrida, where the stability of anything tends to disappear and the apparent unity is merely a question of games.

The essential feature of Latour's own perspective is the emphasis on dualities in the very structure of modernity. Modernity always consists of a basic duality: purifications

and attempts to constitute a great divide are accompanied by newer and newer hybrid-izations. From this perspective, it is interesting and only natural that both focus on the need to reduce the polarities of the world that would constitute a "nothing but" approach to the problems of personhood, and the chaotic vision constituted by the trends toward annihilating the person. This has to be kept in mind not with an aim toward a historicizing disillusionism. Rather, in order to see clearer what the novelties of our time are in fact.

The issue of the disappearance of the person showed up not only in the French school of social representation, but in the role theories of social science as well. These trends are either in the form of overall speculative models, like the ones proposed by Simmel or Maurice Halbwachs, or milder and more technical proposals that lead to role theory as a synthetic notion in social science. Essentially, humans are seen by these authors as a sum of their social and societal roles. The claims regarding an inter-nal chaotic world and the proposals toward a playful hypothetical unity do character-ize modern thought at least since the time of David Hume. The novel aspect of the postmodern condition is the joint appearance of these moments. We are likely to talk in parallel about internal, mental dissolution, and outer, social dissolution as well. Ways of life and language games that were treated as entirely autonomous spheres in the illusions of modernity start to find each other again. Not in the sense that their sep-aration would stop and they would merge, but in the sense that the representative fig-ures do realize the joint structural moments, the fact that they all campaign against essentialism. Of course, here again we can find historical antecedents. This duality of internal and external breakdown was characteristic of the Austrian source of postmod-ern thought, especially in the works of Ernst Mach (1897), as pointed out by Nyíri (1992) in his search into the sources of postmodern ideology. In general, Latour sum-marizes his view on modernity, postmodernism and premodernity. Of all the three, he is in favor of the courageous and forward-looking aspects, the clear daring way of thought, and the cult of liberty that would go hand in hand with tolerance and a multi-plicity of thinking. At the same time he would prefer to suppress obscurantism, bad conscience, and destructive criticisms.

Regarding issues more specifically relevant for us, Latour opts for a dual concep-tion regarding our world of today. The hybrids that question the victorious march of modernity are *de facto* strengthened in everyday life as well. Just think of how diffi-cult it is to disentangle nature and society in contemporary epidemiology. This is true regarding research on AIDS, but it also holds from another side as well. Points of view emerge in social science as well that treat the process of spreading representations in an epidemiological framework: individual representations constitute a starting point, and they spread like diseases, their relationship to social representations being the same as the relationship between a flu epidemy and individual ill people (Sperber, 1984, 1994).

In Latour's analysis, the new feature of the epistemology of present-day society is the prevalence of *networks*. One has to think of real, technical nets such as phone or electric networks, and symbolic networks as intriguing webs of humans. It is again Nyíri (1992) who points out that this first appeared in the form of transportation net-works a good 150 years ago, and how its importance was soon realized by holistic

198

philosophers of history, such as Arnold Toynbee. Nowadays, the NET makes use of all of these networks, most prominently the electric and the phone nets, but at the same time it constitutes a symbolic system of connections that relativizes many human relations and networks, most notably that of people being at the same place. It is an open issue, of course, whether all of this really cancels the role of reference groups and "invisible colleges" that imply a certain level of individuation. Are they really replaced by impersonal networks or only supplemented? And of course it is a repeated issue of cultural criticism and not only due to the hard drive of the Bazarovs of the new culture to allow an allusion to the *Fathers and Sons* of Ivan Turgenev, whether depersonalization is not a price too big for the freedom of the NET.

The prevalence of the new symbolic networks has striking epistemological consequences as well. It would become more difficult to imagine mind and the mental realm as something of a floating immateriality, but at the same time it would also be hard to locally identify it with something. Where is the knowledge behind the result of a network search? Certainly not on the screen, but then where? In my machine, in the local net providing access to the network, in the search engine, or in the entire set of all the machines that were reached by the search engine in the NET?

In Latour's vision, thinking in networks becomes of essential interest since in his view the real threat against humanism is essentialism. The solution toward all the troubles of our age is to proclaim the plurality of man, and an emphasis on our being members of a multiplicity of networks. This would be the real overcoming of "premodern leftovers". A few decades ago, descriptive sociology treated it as a special stressful fact of life of working women that they belong to several nets (workplace, family, intimacy). At that time, however, these were not yet referred to as networks, rather, as roles in a possible conflict. By today, it became transparent that we all are women: we live in multiple networks.

Humans before modernity were not only different from modern humans in that they were parts of hierarchies, where they fully identified with their role, but also in the sense that they had but one single social role. Modernization (most of all life in the big cities that is so many times referred to as alienating) had a liberating influence by providing for a multiplicity of social and societal networks. We constantly fight for the independence of different networks, just in order to try and to relate them to each other again and again. And as we have already seen, that constitutes one of the basic tensions of modernity. One may conceive it as the basic neurotizing set. We have to realize, however, that we have no choice but to live with it. As Andrew Angyal (1941) spelled it out again in his vision on personality, humans want to be independent and to be attached. Present-day symbolic networks raise the same challenge for each user.

Machines, progress, and disintegration

All of the above has several connections to the issues specifically relevant in our context. In the "dialectical framework" outlined by Latour, modernization always involves two types of movements. Independence and separation, and the search for autonomy provides for *Leitmotiv.* Beside this "great narrative", however, modernization is also

about constant "remixing", eternal hybridization. This feature has some consequences regarding the relationship between machines and humans. On the other hand, we tend to preserve the specificity of human thought, the great idea of modern thought, the clear epistemic separation of the knowing subject and the object known. On the other hand, we wish to understand and explain human thought. In order to do this, however, one has to make an object out of the thinking subject. This is the eternal dilemma of the "naturalistic attitude" employed to humans. In this dilemma, information processing machines come handy, creating the illusion to overcome the original dilemma through their practical and theoretical use. They promise to treat humans and objects in a comparable way, with an eye on the form of thought. Haugeland (1981), in characterizing the cognitive turn of psychology and different social sciences concentrates on "the form of thought" as the decisive feature. It seems to be the case that in the information society, we find a common denominator for the subject and the object. Cognitivism starts to interpret humans on the model of information processing machines, and the corresponding mathematical and computational chapters. Not only can we describe machines and humans in a similar way, but we are rather successful in making our machines solve tasks that were considered to be of a real intellectual challenge. Therefore, at least part of human thought itself starts to be seen as algorithmic. That is to say, many intellectual tasks prove to be of a nature that allows solution by local, in themselves stupid procedure (about this interpretation see Dennett, 1994). Our successes make us afraid of them, however, and we start to deny that this story would be about humans at all. Thus, in this promising way out as well, we go through the trail of "reduction", followed by "disappointment" and the "reclaiming of human dignity".

This process is a typical process of modernization from another perspective as well, corresponding to the dualities of Latour. The road was never a one-way street. Not only did the Machine have an impact on the image of man, but at the very beginning, the Machine itself was formed on the model of humans. There is interaction here even from a broader perspective. To what extent is the personal computer a technical and a social event? Society of course has an impact on the interpretation of technology, and *vice versa*, the world of objects gains a clearer and clearer impact on society.

These latter moments are of special interest to us. Not merely do Machines have an impact on humans, but human-made Machines have a feedback influence on their creators. The recognition of this fact is not entirely new to the information processing times. George Bence (1990) in a work originally done in the 1970s, thus antedating the renaissance of the sociology of knowledge, showed the dialectical relationship between technology and society not allowing for a one-way determination of any kind. The novelty for the present-day situation is that the same issue is rephrased with a higher stress on mentalities – on the cognitive side, if you like. The cognitive aspect moved to the center due to a real technical reason: the new Machines were made on the model of human internal life to the extent that they treat symbols. This was extremely important because in the local context of the intellectual information revolution, many preceding changes of everyday life in official academic psychology as well as social science were dominated by a contrastive view of humans: as prevalence of behavior that can happily live without internal processes. Official behaviorist psychology put the naive view of humans into parentheses. Thus, the machine vision oper-

ating with internal information flows and representations in this context had a rather liberating influence on psychological thought instead of a restrictive influence. This vision emphasized that very "hard", objective matters can be dealt with a supposition of internal processes. Modeling does not entail subjectivity (Segal and Lachmann, 1972).

The dilemma of separation and unification comes back in connection with the Machines, not only regarding Subject–Object relations, but regarding autonomy as well. We are attached to the idea of the separation of Machines and humans (as well as to the separation of objects and society), while in everyday life, machines become more and more part of the human reality. Our fear that machines may make us lose our autonomy is constantly strengthened. Not only are we unable to land on the Moon without thinking of Machines, but some of us can hardly count without the corresponding machine.

The issue of autonomy and the two visions of Descartes

> *After having thus taken into consideration all the functions that belong to the body alone, it is easy to understand that there remains nothing in us that we should attribute to our soul but our thoughts, which are principally of two genera – the first, namely, are the actions of the soul; the others are its passions.*
> (Descartes, 1649/1989, p. 35, 44–45)

The archetypical master of great divides and separations is, of course, Descartes. It was he who, having given up the Aristotelian vision of the soul, separated body and mind, delegated the latter as "a mere spirit" to the mindless machine. It was him who separated automatized bodily functions from the reflective world of cognition and limited "the mental" to this reflection. In his well-known analysis, Lancelot Law White (1960) pointed out that this identification of the mental with the reflective resulted in the modern-day dilemma of unconscious mentation: first we force unconscious processes to disappear, merely to rediscover them later on.

The reflective soul has no other function but to cognicize. This creates an image of humans with several "stories" where the thinking soul would preside over the fallible body and over the physical world as a little homunculus, as the Hungarian psychologist Paul Schiller von Harkai (Schiller, 1947b) caricatured it.

With this portrayal, Descartes presented us with the dilemmas of the philosophy of mind that are still with us. Since automata – as it has been happening indeed since the time of John von Neumann, i.e., 1951 – became information processing automata that deal with seemingly mental processes with algorithms and as algorithms, the questionundeniably arises: what is the need for the world of the soul beyond this point?

Recently, Daniel Dennett (1995) pointed out afresh the centrality of the notion of algorithms in this regard. In his reasoning, algorithms constitute the central issue regarding the mind as well (Dennett, 1987): in contrast to people believing in the irreducible world of the mental, he basically claims that all mental processes are amenable

to algorithmization. We are machines, but machines of a rather special kind. All that goes beyond this (e.g., by emphasizing the irreducible world of experience and qualia) would in fact constitute smuggling back the soul. Similarly, a challenging issue regarding the process of evolution that many times indices the intervention of hidden higher processes is the fact that the richness of living forms is the realization of an algorithm: natural selection (Dennett, 1995). This algorithm is rather slow and clumsy. It has all features of a tinkering algorithm (Jacob, 1977; Dawkins, 1986).

According to radical interpreters of computational theory, there is thus no need whatsoever for the soul and its derivatives, for these remainders of Cartesianism. It is exactly one of the pillars of Cartesian thought, the conception of automata that leads to the denial of the other pillar, soul. In order to claim this, of course, you do not have to be a computationalist. In a naive sense, this is true for classical radical behaviorism as well, and in a finer sense for the criticisms of private language. To take a present-day author, Quine uses a clear and at the same time ironical language when he talks about the body-mind relationship: "Unless we were able to argue for bodiless soul, it would be strange redundancy to hold a dualism for the body-and-mind relationship" (Quine, 1985, p. 5).

The strong AI view that constitutes an extension of radical computationalism believes that machines will imitate humans, further, by using identical steps. (Since humans are also only one type of a machine.) This way of thought is optimistic about machines, and it also suggests an identity theory regarding the relationship of body and mind. Its critics, Dreyfus (1972; 1979) and Searle (1980, 1992), however, claim that all important issues come after the algorithms. Machines do not have an original or primary intentionality: they lack experiences, and relate to the world only through human interventions. In a machine, the word *flower* does not refer to anything, except to other states of the machine.

One way to answer this challenge would be to look for a correspondence between this theory, on the one hand, and the syntactic vision of the human mind, on the other (Fodor, 1975, 1980, 1985, 1990). This is an essential feature of many theories of language as well. There, too, our signs obtain their meaning primarily in their relationship to other signs. Thus, there is an interpretation in which the solipsism of the machine does not separate Machines from Humans, since Humans would be initially solipsistic as well. Or, if there is any separation, strong computational theories would separate different philosophies and psychological traditions. If you prefer, they would separate first person psychology from second person psychology. Therefore, their open and debated questions are partly familiar as well: the debates about the relationship between computational theories and qualia and internal experience reminds one of the epiphenomenalism problem of early behaviorism. According to radical models, experiences are of relevance to science only if they become causal factors.

The root of these problems could be traced back as far as the Cartesian separations. If humans are a coupling of a machine and a Thinking being, and furthermore, in its modern interpretation, the essence of the Thinking being is the use of signs, this is the feature that separates humans from animals (this is the interpretation provided by Chomsky, 1966, for Descartes), then the very moment machines start to process signs, the following issues inevitably arise: What other need do we have for a thinking being?

Would not signal processing exhaust the human essence that was of a linguistic nature anyway? Chomsky's reply already in his *Syntactic structures* (1957) was that it DID NOT suffice. The reason offered was that available usual theoretical automata would not be able to deal with the formal creativity and openness of human language. In other interpretations, Machines can deal with the formal creativity of human thought, but are at a loss regarding its semantics.

Descartes, and this was clear well before the advent of modern information processing machines, initiated two traditions in modern thought. (For a similar interpretation, see Richards, 1992.) This duality shows up when we talk either about the body-mind relationship, or about the organization of thought processes. One of the traditions is radical monism. Soul is merely a luxury, at most an excuse for religion. Not only are animals machines, but humans are machines as well. This slogan is familiar from the time of La Mettrie's (1749) *"L'homme machine"*. In its linguistic interpretation, being human is identified with the formal side of language, this formal side being amenable to our machines since our machines are information processing machines using a pattern recognition mode (Vámos, 1990). Humans, as well as the machines created by them are further interpreted as being information processing machines.

The other tradition is that of the dualistic Descartes. According to this, what is important in humans is projected on the canvas of an internal thinker, an internal observer. This aspect of "experience" and reflection cannot be reduced to aspects of the body, and this is what is missing in information processing machines. Though humans are beings of a dual nature, their essence is the soul, the spiritual moment. This is where they differ from animals, and today from machines.

There are two images of Descartes regarding the organization of thought as well. The existence of this duality is questionable in Descartes. The Cartesian tradition today highlights either the unified theater, or the mental build-up corresponding to different "faculties". In reality, the unified image is the dominant one.

Cartesian unity

> One cannot in any way conceive of a half or a third of the soul, or of what extension it occupies.
>   For there is only a single soul in us, and this soul has within itself no diversity of parts. The error which has been committed in having it play different characters, usually opposed to one another, arises only from the fact that its functions have not been rightly distinguished from those of the body.
> (Descartes, 1649/1989, p. 35, 44–45)

The essence of thinking in this view would be its *indivisibility and unification*. Humans would think in this view in a unified way, using a means-ends rationality, and thinking would be unified within each individual as well. The first one is the issue of *universality,* and the latter would be the aspect that is referred to by one of the founders of

present-day computationalism, Alan Newell (1989) as the *unified* theory of thinking. All of our intellectual processes are being reduced to a common denominator. This common denominator is the search for patterns and the use of actions according to this. There are of course differences depending on whether a cognitive system uses many patterns and is characterized by slow search but few inferences, or on the contrary, there are few patterns, and search is fast, but inferences are time-consuming.

The followers of the Chomskian metatheory emphasize the first aspect as the principle of universality of thought: languages, i.e., the most central fields or domains of thought do not differ between themselves in their most crucial aspects. A further Cartesian aspect of this is the belief in a unique center of thought within the individual: as one would tend to say today, the belief in a unique computational field. Everything is governed by the principle of central organization. As some present-day critics of this conception like Dennett and Kinsbourne (1992) put it, this is the idea of a Cartesian Theater. Events of the internal world happen on a single stage that is easy to oversee. In other words, in the beginning of experimental psychology this was expressed by the "search light metaphor" of consciousness (Wundt, 1897): human consciousness can be conceived as a narrow beam of search light in the ocean of the internal world, as a moving light that steps out from this ocean.

All of this thus represents the doctrine of a unified and integrating Ego. Our Ego is the starting point that would put everything into a unified primarily given category system. This vision is taken over to the contemporary world and toward the machine views of man. Under its impact, we start to build information processing machines. There is a language-centered view of cognition that corresponds to the Ego-centered view of humans. All human cognition is assumed to follow a sequential pattern. This is the architectural thesis of classical cognitivism (Anderson, 1983). Sequential processing on its own turn follows a descriptive model of natural language (Winograd, 1981). In practice, this means that everything has to be put into a sequence when we think of it, and during this transfer or coding, a propositionally organized system of "containers" is used. This would be "the language of thought" in its radical rendering (Fodor, 1975).

Regarding the way of the computation of the machines, this would correspond to the classical Neumann-type architecture that has but a single processing unit (Newell, 1989). The classical computer is not unlike Descartes's vision of man. Everything is translated into the language of arithmetical and logical operations (this is also similar to the rationalist ideals). Furthermore, all of this is done at a single place, in a single central processing unit. This would correspond to the integrative Ego, to the soul as conserving with the pineal gland. We should not look down on this architecture as a machine-based solution. The ingenious insight of Neumann (1951) was not the discovery of sequential thought (that is an old favorite of logocentric Europe), but the idea to store programs as data in the machine. Campbell-Kelly and Aspray (1996) in their historical survey drew attention again to this historical discovery. Without this move, machines would always need a demigod even for long additions who would always tell them what to do exactly at a specific moment. Without stored programs, the whole idea of a similarity between machines and thought would never come up. Socially, this vision of Cartesianism corresponds to one variety of modernization, namely central

204

planning. The integrative and integrated Ego inside would correspond in this view to one God, one Church, one King, and one Authority whatsoever. This is the Catholic, Royalist, Planned Economy model of internal life that employs the intentional stance with no worries to the parts of the system. This stance is trivial and pervasive in our naive psychology, in the folk psychology of everyday life (Dennett, 1987), and claims that our acts perform and realize Plans. The homuncular problem is that this stance cannot be employed to parts of the intentional system, only to the integral system in its holistic unity.

A modular Descartes?

There are some attempts to uncover another Cartesian tradition, even regarding the organization of thought processes. In this view, all cognitive tasks (domains in the present-day idiom) would have a separate processing system, and human cognition would be organized according to differentiated processing systems, differentiated qualities. Like the processing and the experience of the world of sight and sound is trivially different form each other, higher faculties would differ from each other in a similar manner.

The nineteenth-century historian of philosophy, Friedrich Lange, in his critical treatise on the *History of Materialism* characterized this trend regarding nineteenth century phrenology, but the trend is still valid as of the present-day non-unitary views of cognition.

> *We have a parliament of little men together, of whom, as also happens in real parliaments, each possesses only one single idea… Instead of one soul, phrenology gives us nearly forty, each in itself as mysterious as the life of the soul in general.*
> (Lange, 1880–81, III, p. 124)

According to present-day usage, human information processing and the human mind would be organized into *modules,* and the role of Central processing or general Problem Solving as it was emphasized by the unified view would be limited and, most importantly, only secondary. Modular processing would go on in an automatic encapsulated way, with little care for general context and the like.

It was to capture Descartes entertaining this view. He certainly considers language to be central to human superiority.

> *[…] we may also recognize the difference that exists between men and brutes. For it is a very remarkable fact that there are none so depraved and stupid, without even excepting idiots, that they cannot arrange different words together, forming of them a statement by which they make known their thoughts; while, on the other hand, there is no other animal, however perfect and fortunately circumstanced it may be, which can do the same.*
> (Descartes, 1637/1911, pp. 116–117)

But it is hard to see Descartes as someone moving from here to the claim that the different cognitive abilities would be operating independently of each other. It seems to be that present-day rationalist authors are looking for ancestors of their claims in the past, while their approach is referred to by themselves on the whole as Cartesianism. This tradition is easily reconciled with the idea of a central undivided Ego and with the corresponding idea of a central stage. Gradually, however, rationalists themselves emphasized more and more the task-specific nature of their inquiry. They emphasized this regarding the postulated rich innate structures related to a given outcome like human language (Chomsky, 1980), and also related to their distaste for machine models of general intelligence. A favorite point of reference for them is nineteenth-century phrenology (Fodor, 1983).

Due to these changes, they try to discover some task-specificity in Descartes as well. Quotes of the above type are used more and more as evidence for a task-specific thought, namely for a *faculté de langage* that would be human-specific as contrasted to animals, but task-specific as well. One Cartesian interpretation takes language as a starting point for the validity of a propositional and sequential organization all over the cognitive domains (that is the unified view), while the other one also starts from language but considers it to be a specific cognitive system unrelated to the others.

In cognitive theory, the task-specific way of thought outlines a modular view of processing: many extremely fast processing systems with a small scope populate our mind, which are rather stupid in themselves. They were formed in an evolutionary manner and in a way they indicate the materialization of faculties into brain-related functional organs. It remains a question of course that no matter how small the General Problem Solver module becomes, it can still be a further specific module or it might represent a general principle of brain organization, or even in a dualistic way, some equivalent of the soul.

A technical and machine-related change also corresponds to the modular way of thought: the idea of parallel computational architectures. And in its human side, this is accompanied by a claim for the autonomy of human domains of life, and a division of power. However, this latter argument in modernity typically belongs not to the rationalist, but to the empiricist way of thought. It implies a world where order is only secondary, bottom-up, it is not given birth in a top-down manner. On the human scale, order and design are only the result of the application of a stance, and do not result from an essentialistic attribution of intentions to things (Dennett, 1987). In evolutionary terms, all of this amounts to the claim that "design" is distributed over the entire network of beings struggling for their survival (Dennett, 1995), and should not be taken as an initial starting point.

It is hard to fit this second hidden reading into the historical image of Descartes. It is hard to imagine him as being the initial point of the divides as well as that of unification. The "modular Descartes" is a *contradictio in adiecto* for most of us, and it might only be proposed as a result of the search for the roots of present-day rationalism in starts of classical rationalist thought.

Two types of divided self

All of this has an interesting implication regarding the issue of the dissolution or deconstruction of the self. It implies a duality of approaches in this regard as well. The first conception is the traditionally well-known empiricist-associative dissolution theory that was initiated by David Hume. The Self is not taken as a stable point of departure, rather, it is a mere "bundle of sensations" that for practical purposes we treat as stable, but we have to be aware of the hypothetical nature of this move. It is a mere fiction, a narrative gravitational point, as it is said today (Dennett, 1991a), or a hypothesis that has evolutionary reinforcement, as proposed by Ernst Mach (1897).

The other dissolution view is the rationalist dissection of the mind. Fodor (1983) and other innatists see the phrenology movement of the 19th century in this perspective, and the rationalist psychology of Christian Wolff in the eighteenth century as well as the Scottish Enlightenment with its faculty view of the mind also proposed that the human mind has no single guiding principle: humans are a combination of a multitude of faculties (for a comparison of these two views see Richards, 1992). This faculty psychology in most of its varieties, does not merely concentrate on cognition. Rather, it serves as the basis for the tripartite theory of mind into Intellect, Emotion and Will, or Cognition, Affection, and Conation, as it was proposed by Kant (1787/1965). Cassirer (1955) presents a classic interpretation of this, while Hilgard (1980) and Richards (1992) give a present-day account.

This duality exists today as well, as a kind of continuation of the empiricists and rationalist traditions. The dissolution claims to have two intellectually respectable varieties presently as well. One is the associative-constructions vision, where the Self would be but an island in the continuous flux of information. The negative aspect of this is emphasized by the connectionists, when they dissect the mind into the working of associative engines (Clark, 1994). This constitutes a renaissance of the classical associative view of the human mind. As a rather peculiar aspect of this, the associative engines are made responsible through self-organized processes of learning for emergent properties that are given neither in the learning rules, nor in the input (Smolensky, 1988). Connectionism has at least two facets: it can be interpreted as a theory associative chaos and arbitration, but also as a theory of order emerging out of chaos. This leaves the door open for a constructivist interpretation of Connectionism.

Daniel Dennett's (1991a) constructivist theory is proposed as a narrative metatheory of consciousness. The integrity of the Ego is but a fiction.

> *A self, according to my theory, is not any old mathematical point, but an abstraction defined by the myriads of attributions and interpretations (including self-attributions and self-interpretations) that have composed the biography of the living body whose Center of Narrative Gravity it is.*
> (Dennett, 1991a, p. 426–427)

The fictive entity is as important as the Gravitational Point or the equator in describing the physical world. They are extremely important abstractions that are not exactly

tangible. In a similar way, the construction of the fiction of a stable Self is an important point of orientation.

The other dissolution view starts off from the rationalists modular vision of the mind. The most remarkable version of this interprets "higher", intellectual processes on the analogy of a multitude of task-specific microchips. This is valid in another sense as well, specifically regarding the Ego or the Self. This view traditionally spoke not only about cognition but about "moral" faculties as well, or even about the inborn nature of "sympathy" (Richards, 1992). Present-day modularists also treat social understanding and self-interpretation as a result of the working of evolution-based social modules. Our theory of mind, i.e., our theory of social behavior being mediated by an internal conscious agent, would be the result of the working of a domain-specific system of naive or folk psychology. We would not only be equipped to be task-specific systems for the recognition of speech sounds, or faces, and other highly complex cognitive achievements, but for the interpretation of each other as agents. (Gergely, Nádasdy, Csibra, and Bíró, 1995), and even of attributing consciousness (Leslie, 1987). This would in a way close the circle. One can remain Cartesian without postulating a separate soul and a unifying theater. But the basic forms of sociality would also originate in biologically organized modules. Both the external and the internal order would have an evolutionary explanation.

Present-day Cartesians are at a loss when they try to reconcile the two images inherited or uncovered from Descartes. The same Jerry Fodor (1983) who is the champion of modularity, at the same time campaigns for a language of thought (Fodor, 1975, 2000) that would unify all our knowledge into a system of propositional representations. Regarding the cognitive architecture, it is not even clear where we should locate the language of thought. Is it a system of containers that gives form to all the outputs of modular processing, or a further modular processing that takes the output of the other modules as its input. We might have a modular, but due to its obligatory nature rather Cartesian, picture of the mind.

Some converging points between machines and personality

Both in the everyday culture and in the culture of science, there are several joints where computers and the informational and machine-like modernizations relate to the issue of personality. This is a triviality. We should not forget, however, that the very separation of the two cultures was a trap of modernization in the sense Bruno Latour (1993) talks about similar separations. It is misleading in a similar way to talk about changes in life and in self-reflection. It is a distinctive feature of our times that a more transparent contingency characterizes the two. None-theless, the expression "our times" should be used carefully. Mental history revealed many things about the impact of mechanical machines on the way we started to think of our own body, and about the affinity between the unifying role of money and the way we started to think of a universal language of thought. The novelty of the present day is thus only relative, and according to the diagnosis of many, it is merely the novelty of turning points that is usually treated as a point of separation.

Three changes, the importance of everyday life and some fuzziness

Computers change scientific psychology;
                 change everyday life;
                 change the self-image of humans.

The way information processing machines changed the vision of scientific psychology about the working of the human mind is only one of the layers of the impact of computers. Machines and the "box mentality" of early cognitive psychology provide each other with powerful metaphors. Humans are analyzed as Machines, while following the intentional stance, human characteristics are attributed to machines. A second layer, which later came about the impact of computers is the change in everyday life due to computers. The modal personality of our times also changed due to this. Changes in everyday life change personality as well without too much reflective intervention. Finally, both these everyday changes and these "scientific memes", these conceptions about the order of the world also changed the way we, as scientists and as layman, started to think of ourselves.

A decisive role in this process was played by the intervention of the Machines into our everyday life. Computers showed up in the intellectual field of high culture when machines in the physical reality were part of the life of only the chosen few. The works of Turing or John von Neumann did not emerge as something that was relevant for all of us. Campbell-Kelly and Asprey (1996) survey these changes.

The intellectual challenge implied by the computer was first not relevant to our earthly world, since in our everyday life we did not meet machines for quite a while. What were the everyday changes, and why were they so fundamental and radical? From the time of the personal computer on – unlike in the time of the mainframes – we every day have to face the fact that we tend to take up the intentional stance regarding our own machines. ("This bastard would not take the file name!"). Do we have to interpret it literally, i.e., implying that we are so stupid that we take the machine to be a human agent, or as a way of speaking? The practicing intellectual is put on the downhill slope of issues of the philosophy of mind. Do we take up this stance regarding partial achievements of the machine, continues the question, even in cases when, e.g., in a traditional non-AI intended programming language we write something like "DO 12", or we let our word processor know that it has to SAVE? Overall, in what sense of this word do we "say" these things to these systems?

As a rule, we interpret it to be an error to take up the intentional stance even regarding details of a mechanism. In this respect, however, we are not too far from the way we tend to treat humans. It should not be taken as a sign of a Great Outer Divide, in the sense of Latour presented in **Table 17.2.** In connection with human beings, it is a great traditional issue of the philosophy of mind to attribute an intentionality to parts of the system that would normally merely belong to the integral system as such. It is at least strange to talk about "grandmother cells" in the brain, and it usually raises the charge of homuncular solutions.

Thus, changes of perspective or stance accompanying changes in attributing intentionality are true for our dealing with biological systems as well (see, e.g., Clark,

209

1989). The issue of signal usage is slightly different form this. It comes up as the following problem: is it licensed simply on the basis of the use of words to claim that machines somehow understand signals and attribute intentions to us? In simple cases, we of course realize that the programmer represents certain entries with a series of symbols that take into account the linguistic system of the user that originates from somewhere else, but in fact the series of characters could as well be EVAS rather than SAVE. This is by far not as trivial as it first sounds, since it takes us back to the roots of the "syntactic theory of the mind": sings would not have an original meaning but the mind as a semantic machine would constantly try to attribute meanings to the signs (Fodor, 1990).

When would one start to feel uneasy and have doubts that the machine might still think? Most naturally in cases where the machine would accept variable inputs. On the input side, this doubt would arise, for example, in cases when the non-human system would, e.g., properly interpret paraphrases. It would treat the sentence *Close the door* as being equivalent to *Why don't you shut the door?* or *Would you mind keep the cold out?* One of the basic issues of attributing intentionality is the issue of adaptively flexible behavior, as it was emphasized in connection with living cognitive systems (Clark, 1989) for the other, the output side. This provides the foundation to attribute intentionality to a system in the sense of ABOUTNESS. This is not any kind of flexible behavior, but one that follows a sort of a semantic equivalence. We should realize that the real test of understanding even in humans is not whether they can reproduce a sentence just heard in a verbatim way, but rather if they are able to reproduce it "with their own words", as the eternal schoolmaster would like to put it.

There is a great danger of self-cheating and too easy attribution immanent here, and not only in the case of the above simple sentences, but regarding complicated systems of conservation as well. The infamous ELIZA program that purports to imitate a psychotherapist provides us with seemingly flexible answers. But in fact, it mainly generates wh-questions using simple procedures. The dialogue below shows coherence only due to its presupposition of a third party, a human understander who would suppose and attribute an internal world, empathy and the like into the moves of the dialogue. This is done not only by us, the third party, but also by the second party, the human agent conversing with the machine.

Therapeutist: *Why do you feel so badly?*
Patient: *My daughter does not like me.*
Therapeutist: *When did your daughter start not to like you?*
Patient: *Two years ago.*
Therapeutist: *Why does not she like you?*
Patient: *Since she says I am too selfish.*

Weizenbaum (1976, p. 189), the author of this program, already noticed that similar effects (i.e., for illusion and experience of coherence) could be attributed to the mind of the user: "ELIZA created in several people conversing with her the remarkable illusion that it understood them". It is very well possible, of course, that the same thing happens to us in real psychotherapy with real psychologists, and the attribution of

210

understanding is only a hypothesis regarding humans as well. Computer experts are not as stupid as the humanists being afraid of machines would put them. Weizenbaum, the engineer named his program with G. B. Shaw in mind since the program speaks better and better like ELIZA Doolittle in *Pygmalion*, but we never learn if it ever got smarter, in the same way that we are never able to decide this regarding ELIZA Doolittle either.

Machines and scientific psychology

All the above including whatever was said about the importance of machines should, of course, be slightly softened. For changes in our view of man and for philosophical debates, desktop machines with their daily presence were needed. For changes in academic psychology, however, the mere knowledge that the machines do exist somewhere was sufficient. In academic psychology, the attraction of information processing machines was visible early on, from the late 1950s. The Cartesian machine way of thinking prevalent in many psychological theories contributed to this. It is an essential feature of modernity to think of humans as machines. Moscovici (1968) provided an interesting survey about this, since he also highlighted the Cartesian aspects. Machines and the engineering vision of humanity is presented in his approach in the light of the philosophical machine problem. Looking back from the time of the computer, Weizenbaum (1976) and the volume on science history edited by Serres (1989) presents a similar image. Richards (1992) goes as far pointing out that the dynamic regulative image of the steam engine already contributed to the formation of a reflex-based vision of the nervous system. Let us take a slightly closer look at this tradition without too high ambitions regarding professional technical history.

Machine attractions and the machine as a pattern of thought

As it was mentioned several times earlier, there is a back and forth relationship between man-made machines and the view humans have of themselves. One has to keep in mind that there are three rival images regarding the relationships between human mentality and machines summarized in Table 17.2. These are in fact visions of a different level of abstraction. **Table 17.2.** lists examples for each of these from everyday life and from sciences as well.

Table 17.2. Three complementary visions of the role of objects in our thought

Conception	Direction of determination	Examples (scientific, everyday)
Machine determinism	Objects shape our life	Chronometry and astronomy clocks and everyday punctuality
Metaphoric	Machines shape our metaphors	Nervous system as switchboard boxes in our memory
Instrumental	Objects represent thinking itself	Fog chambers and elementary handwriting, printing, calculators

Machine determinism

This view in its extreme form would claim that man-made objects and technology would determine the development of both science and everyday life. This view is entertained both as a scientific theory and as an ideology as well, and in this latter respect with rather pessimistic consequences. Let us start from the bad side. There are theoreticians according to whom technology has a determining power, but it somehow happens that it always produces the bad side from people. Several accounts of this situation were given in sociological and moral philosophy frames, where the issue is not really the interpretation of individual tools, but rather the critical analysis of tool producing technology. Ellul (1954, 1967), in a recently rediscovered analysis, presented a rather pessimistic criticism. In his view, it is technology that leads to concentration, to uniformization and to an integration of different systems, and this is the source of all ill things. We should not forget that all of these worries were born before computers and networks were present.

As a natural counterpart to Ellul, we could list scientific conceptions that also claim the determining force of technology, without the same pessimistic overtones, however. In human ethology, it is a general notion to claim that an essential feature of hominids and especially modern humans is the extraordinary interest in objects. Further, some even claim that the world of objects forms an independent evolutionary level in the systemic theory of evolution. In this view, standardization itself and the increase in the level of identical replication is not to be treated as a social minus, but rather as a positive feature, both in an adaptationist and in a scientific vision (Csányi, 1989). Taking a scale of hundreds of thousand of years, standardization of tools seems to be a positive development (Donald, 1991, 1993), and in general, tool use and tool making is treated as an important moving force of human genesis, not only in biologists but in social scientists as well (Moscovici, 1994). Why would the same thing turn to be a negative factor nowadays?

Ellul (1954, 1967) can be interpreted as a representant of the rather widespread technical pessimism. It is worth considering that if the deterministic view he presents is indeed as strong as it is claimed to be, and technological logic would unavoidably lead to dehumanization and conformism then what is the fuss about? Ellul refers to the savior role of Christian ethics against the process of dehumanization. We might, however, try to take a more ironical view here as well. We should realize that the cultural pessimism inherent in the fear of machines is a social fact and effect in and by itself, rather than being a law of nature. Due to this fact, the purported determinism is far from being a unipolar determination. Ellul himself feels to be an issue when in the last chapter of his book, he mocks utopistic predictions for the year 2000. It is remarkable that the analysis of determinations – be it a determination of humans on society, machines, or of thinking form the brain – characterizes modern thought as a positive program and as a constant fear as well. And what we in fact experience is a result of this dual process: the man who is determined by external factors and riots against this determination (Camus, 1954).

Metaphoric transfer

The methaphoric aspect of the impact of machines is so much part of our everyday thought that we have difficulties noticing it. We always tend to talk of our internal world in terms of an external reality. This is trivial in the birth of mental terminology, and recently it was established as a theory about the origin of scientific psychological terminology (Richards, 1992): scientific terms of psychology are about objects to begin with and obtain an internal reference to the mental realms only in a second step. Even hard-nosed experimental psychology today applies object-based metaphors. Roediger (1980) and Hoffman, Cochran and Mead (1990) show clearly that the metaphors of trace, vax table, storage room, path show up in the world of present-day scientific discourse as well. The computer in this process is by far not the basis for a metaphoric system towards humans. Rather, we tend to take over object metaphors applied to humans from computers.

Instrumental extensions

According to the instrumentalists, one has more to do here than merely talk of metaphors. Objects somehow represent thought itself in outer systems of representation. Human knowledge is represented in stone age axes not only for the paleoanthropologist, but this instrument represented knowledge for its user as well, and shaped his thoughts. To take an example from the history of sciences, the famous description provided by Shapin and Schaffer (1985) showed how the production of vacuum as a technical issue articulated the very notion of "emptiness" and how non-existent this very concept was and how many doubts formed an aura around it until humans were able to produce it intentionally.

This instrumental thought was rather radically articulated by Vygotsky (1978) as an instrumentalist conception: objects are outside (extrasomatic) representants of human knowledge, as John-Steiner (1985) emphasized it. Objects become knowledge-mediating vehicles for the child acquiring cultural objectivations. Recently, this kind of mental organization is called by Daniel Dennett (1995, 1996) the problem of Gregory-type beings. Gregory (1981) presented a detailed analysis of the idea of *homo faber*. Its well-known essence is the proposition that instruments may become carriers and shapers of thought. The World III concept of Popper (1963, 1972, 1976, 1994; Popper and Eccles, 1977) discusses these matters on a more symbolic or spiritual level, not on the level of technology. Still it belongs to the same trend in the abstract sense: thought is shaped by objectivations. For Popper, the emphasis is less on objects as such but on thoughts, but for him as well, thought is represented by something like an external organization.

A similar view is entertained in the evolutionary speculations provided by Donald (1991, 1993). His theory on the origin of human culture presupposes steps or grades, as summarized in **Table 17.3.** Two of these touch upon the issues specially relevant to us. One aspect is that he presupposes a mythical culture up to the time of the discovery of writing. Its essential feature is the dominance of orality, and the specific organizing role of narration and narrative patterns. This level of organization allows for cat-

egories, in contrast to mimetic culture, where our ancestors lived under the constraints of episodic thoughts and memories, in the world of individual events. Mythical culture makes everything into a story, and purely logical and hierarchical structures do not characterize it. Interpreting this culture according to the principles of memory organization, it is characterized by episodic organization. Theoretical culture that replaces it is characterized by the dominance of written language. It has as an outstanding organizational feature: the exteriorization of memory organization, the creation of a possibility to be regulated in our behavior by representation created by us, and treated in an extrasomatic way. This would hold not only in the sense of a social convention and objects as representants of knowledge. Possibilities provided by writing would also reorganize the internal world: they would create possibilities for us to extend our working memory. This would allow, e.g., to decrease memory load by talking out of written notes. Notes as external aids would provide the instructions on what to download and what to search for from the stable stores – be them internal or external like books. It is a rather trivial extension to this conception that present-day information networks would lead us further along this road. They would solve the same tasks of being an external aid faster and by presupposing less knowing-how type of knowledge on the part of the user compared to reading and writing.

Table 17.3. Types of cultures and representation according to Donald (1993)
(m: million years ago)

Culture	Species	Age	Memory Organization	Tradition Transmission
Episodic	Primates	5 m	Episodic events	None
Mimetic	Homo Erectus	1.5 m	Body representations	Enacting, Imitating
Mythical	Homo Sap.Sap.	0.05 m	Linguistic, Semantic	Mythology, Narratives
Theoretical	Modern Humans	10 t	Outside stores	Fixed knowledge

The specificity of computers in the impact of machines

Computers in the history of information technology

Thus, computers fit into a rather long, real as well as intellectual story about the impact of machines on human life. However, due to the nature of the machines, their essence being information processing, these machines created a more organic relationship between humans and machines, both on the instrumental and on the metaphoric levels. We do not consider the steam engine to be a human, we do not look for clutches in humans, and while we do consider the pencil as entering our life, and restructure it, this does not lead to humans becoming pencil-like at all. Computers are unlike this: they have memories, and peripheries similar to sensory organs, and we might entertain the idea of comparing ourselves to machines of that kind.

Table 17.4. From nomadic space to knowledge. Pierre Lévy's (1994, p. 139) view of the intellectual aspect of technological revolutions

Age	Field or domain	Identity	Features	Relations
Paleolithic age	the nomadic world of Earth	totem, ancestry	myths, rites	Cosmos
Neolithic age	the world of Territories	territorial identity	writing, geometry, maps	State
Industrial revolution	the world of Commodities	position in production and consummation	material goods, statistics	Capital
Neolithic age?	the domain of Knowledge	competence, cooperation, hybridization	cyberspace, knowledge, economy	Human qualities?

There are several concepts regarding the central role of technological information processes regarding the formation of culture (see Nyíri, 1992 for an outstanding example). Let me popularize another one. Pierre Lévy (1994) proposed a view on knowledge forms and fields or domains of movements, summarized in **Table 17.4.** In their optimistic reading, these changes would today create a new domain for knowledge and skill economy in the frame of the information society.

In Lévy's conception, the stages with their features and limitations are not presented as exclusive realities. New stages do not annihilate earlier ones, rather, they use them.

> *Today, regarding the commodities aspect the domain of Knowledge is still under the constraints of competition and capital computations. Regarding territory, it is under the power related control of states and its is regulated by their bureaucratic procedure. And finally regarding the Earth it is still enclosed into the closed world of* new age or deep ecology *and its archaic mythology.*
> (Lévy, 1994, p. 138)

Computers and machine thinking

Table 17.5. applies to computers the distinctions made at large for machines. The first moment is ordinary, and it is related to the issue of personality but rather indirectly, e.g., due to the fact that using a word processor changes our relationship with the text, it becomes more and more complex as an issue to decide what is stabile and authentic (Nyíri, 1992). This problem of writing technology leads to issues regarding internal life. How far do these technical changes change thought itself, or do they only exteriorize something that was already a feature of thought (Nyíri, 1992). Following the thread, we can move over to metaphors. Some authors propose a multiple versions theory of the Self, claiming that the self itself is no more than a narrative gravitational point in the multiple text varieties interpreting the world. We ourselves act as word processors (Dennett, 1991; Dennett and Kinsbourne, 1992).

Table 17.5. Three views regarding the role of objects interpreted for computers

Conception	Direction of determination	Examples (scientific, everyday)
Machine determinism	Computers shape our life	Tomography, vision research, witing, reservations, billing.
Metaphoric	Computers shape our metaphors	Nervous system and the mind as a computer. We are but points in a net.
Instrumental	Computers represent and embody thinking itself	Strong AI web search, word processors.

Changes in metaphors

Due to the nature of information and a rather peculiar machine substance, computers challenge our entire notion of selfhood. There are three aspects to this, each of which has a relevance from soft humanism to experimental psychology, inclusively.

The first one is *abstraction* research strategy. As Haugeland (1981) characterized it, information processing machines provide new vistas for classical functionalism. The cognitive revolution makes inner processes more visible on the abstract level of information processing. Just think of how difficult it would be to analyze algorithms of addition or substraction on the level of neuronal structures involved as opposed to analysing them on the level of abstract flow charts, where what is at issue is the exchange of contents of different "boxes". Flow charts similar to computer algorithmic charts invaded not merely psychology, but linguistics and anthropology as well.

A related notion is the recognition of *multiple levels of functional analysis*. In the same way as we talk of algorithms, programs, and machine implementations regarding machines, we can think of cognitive models and the relationship between body and mind on similar levels of abstraction.

As a third issue, computers as realized promote and provide a *language-centered linear view of humans, based on sequential processing*. Humans shall be compared to their favorite machine: they shall be interpreted as having processors, small and large storage areas, inputs and outputs, and programs. Like machines, they will be supposed to have declarative and procedural knowledge. On the whole, humans will be supposed to have their own architecture, which implies a physical arrangement as well as a slowly changing, relatively stable system of computation (Anderson, 1983; Newell, 1980, 1989; Pylyshyn, 1984).

Linear machines and human information processing i.e., psychology

The title carries the information that essential issues of human psychology can be interpreted in the framework of information processing bases in machines. *Cognitive psy-*

chology became a key implementation of the idea of the centrality of the notion of information processing. It clearly showed that the notion of classical architecture did and does exist not only on the level of philosophical abstraction and engineering realizations, but it is present in the views of actual experimental sciences as well. Second, academic psychology with its technological mind took over the issue of analogies between humans and machines much earlier than machines would permeate our everyday life. Finally, and this is the crucial moment for us, this is an issue on the level of general analogies. The crosstalk between our conceptions of machines and of man shows up independently of the hot issue of strong artificial intelligence. One does not have to deal with machine thinking to treat humans and machines as well in the framework of information processing models.

David Broadbent, the British psychologist published his duly famous book *Perception and communication* in 1958. Psychology treats humans as information processing systems. He started from technical issues and considerations as well. The basic challenge was the relationship between human information processors and the multichannel information systems of aviation, and the technical toll he introduced was the multichannel tape recorder.

Basically, his researches and model claimed that we are unable to process simultaneous messages (texts) in parallel. Usually, one is only able to concentrate on one text, and we are only aware of the physical features of the unattended message. Parallel processing was presumed at early stages, followed by bottleneck, and serial processing. A system of stores was also postulated, starting from very short-term memory that would represent only the physical features of the stimulation, to be followed by a phonetic recoding: psychologically, this latter would correspond to short-term memory, which would be followed by another recoding into long-term memory that would be organized along semantic lines.

Classical cognitive psychology presupposed storage systems with fixed parameters, and preassigned recoding processes. Today, we seem to be much more dynamic. However, the initial model, with all of its limitations and shortcomings is still a very important reference point. Short-term store and the information bottleneck corresponding to it would equal computing memory stores in machines. On the other hand, sequential thought and limited central resources taken over from machines would correspond on the human level to the old concept of an integrative self. If you like, some of the present-day new approaches, including parallel distributed processing, correspond to a riot against this traditional model.

Academic psychology, computational theory and the descriptive view of language

Another important feature of this approach is the fact that it treats all information as contributing to a joint pool, using common resources. This makes machine architectures and humans very much alike. Limitations of processing, general human limitations are treated as corresponding to capacity and time constraints of one single CPU,

Central Processing Unit. There is a broader analogy as well. This view treats humans as beings that form propositional representations. A machine equivalent to this idea is Boole's dream of being able to translate all intellectual activity into the language of a logical calculus. As Hofstadter (1987) would criticize it, this is the claim that in the final analysis all cognition is computation.

The world of information processing machines makes possible the fulfillment of the old dream to treat humans altogether in a logistic elementaristic way. This is the program of Leibniz to be continued by Russell, the early Wittgenstein, and the Vienna Circle first phrased for scientific cognition. All of our knowledge would basically be of a propositional sort, it could be translated into a long series of propositions, and processing would mean operations over the form of representations.

Cognitive psychology and the theory of computation would extend this program over the whole domain of knowledge, for the entire world of psychology and technology. People are treated as carriers of elementary propositions. One would remember that Wittgenstein (1921) put the emphasis on *elementary facts*. With the advent of information processing machines and cognitive psychology, the weight is shifted over from the reference of propositions to their carriers. Two typical critical reactions will emerge related to this Elementarism. Some people would question whether representations indeed would always be of a propositional form. The well-known philosophical debates regarding image-based representations shall reemerge, using nowadays, however, the tools of experimental psychology as well (Kosslyn, 1980, 1994). On the other hand, one also questions whether all mental matters of consequence take the form of representation or not: Gilbert Ryle's (1949) differentiation between *knowing what* and *knowing how* shall have a central new use. Classical information processing machines and the corresponding psychology would be criticized for singling out the world of *knowing what,* while the domain of *knowing how,* i.e., the domain of skills, would be critically important.

Thus, an academic psychology was formed that treated the human mind hand in hand with a certain type of machine. When we criticize this vision, both in the name of common sense and experimental experience, we seem to criticize the machine-based view of humans. This is partly an illusion, however, and belongs to the illusion of great divides outlined by Latour (1993). These machines did not create their architecture and their underlying programming languages in themselves: they are merely instantiations of a preexisting philosophy of mind, based on the notion of propositional representation. The theory that would dissect our knowledge into propositions preexisted before these machines implemented it.

At the time when we constantly emphasize skills and images, we should not forget that when it was first proposed, this propositional approach in the work of Frege (1892/1984) and Husserl (1901) was clearly opposed to a traditional vision. Its main opponent was the vision that would equate all mental organization to images, therefore ignoring structure, intentionality and propositional attitudes at the same time. The idea of a propositional representation, however, entails all of this. One could even claim that the great turn-of-century revolution in the philosophy of mind (i.e., Frege and Husserl) with their platonic propositions made possible the use of these same constructions for machines and for the human mind as well. This could be called Freges's revenge:

propositions are first weapons of an anti-psychological campaign, to become reinte-grated into psychology a few decades later.

The very idea to make the processing of form (or "shape" as Fodor [1985], prefers to call it) central in information processing existed also well before the advent of these machines. It was present in modern structural linguistics and in the philosophy of lan-guage as well. The great leap provided by information processing machines and their application to humans was not a "discovery" since this attitude existed well before, but the very realization itself was the existential proof that man-made devices that follow these principles do their work.

This attitude is usually referred to as the *symbol-processing metaphor of human cognition.* It is easy to summarize its basic tenets.

(1) Human cognition can be characterized as a recoding process of several steps over symbols.
(2) Human information processing defines a machine that works in a sequential, linear manner.
(3) Our processing limitations are of a single common kind, therefore all demanding processes are translated into the language of a joint resource.
(4) Processing requires the cooperation of relatively small capacity operative storage systems and large capacity background stores. Our knowledge is stored in the back-ground memories, while operative memory keeps the activated knowledge and incoming input.
(5) Our cognition has but a single active processing unit that would correspond to the Cartesian unity of thought.

It is a peculiar aspect of this approach to question in what sense thought itself has a unified structure. How far is propositional organization a feature of the mind itself, or only a descriptive convention? The language of thought, LOT hypothesis promoted by Fodor (1975) rephrases the Leibnizian topic in the light of the machine age. Programming languages translate instructions of a higher order into instruction of a lower order, to arrive at the end at a machine code. Similarly in humans: there is a final language, *a mentalese*. Human thought can be interpreted as an organization where some final instances (the very propositional organization) corresponds to a pre-wired language.

This Language of Thought as a machine code makes it sure that we can avoid the infinite regress. While all thought is symbol manipulation, i.e., translation, at the end there is a language, a form of thought provided by nature herself. The LOT is a linguis-tic *a priori* system.

Altogether, we arrive to a rather peculiar view. We have a thoughtful contemplative man, who concentrates on the form of representations (it is even questionable whether the LOT has an internal semantics or not, whether it is a purely syntactic engine). The ideal form is pure cognition, by using unified principles. This a dry and language-cen-tered vision of humans. We have to remember, however, that this is an old-style dry-ness. it is not due to machines but due to the cognitive bias of the rationalists. If all of this seems to be plain, empty and too analytic compared to the integrity of human per-

sonality, this is not due to the analytic nature of computers, rather, it is due to the analytic nature of all modernity. This relationship between narratives and bodily sources of coherence is an issue that comes back under different disguises.

As we saw above, Dennett is not entirely exclusive in his narrative metatheory. At least as far as the concept of Self goes, he is happy with the body image idea but wants to supplement it with the narrative metaphor. Thus, he is not that far from Modell (1993) as it would seem to be.

The newest image promoted by the computer way of thinking is the one of *networks*. Networks as appealing metaphors show up both within the person and between persons as well. *Neural nets* take over the task of explaining individual achievements. In outside nets, on the other hand, personality and personhood become divided as well, as it happened in classical role theories. Knowledge is distributed over nets, and we ourselves are distributed over networks as well. Pierre Lévy (1994), under the influence of this metaphor, even started to talk about "collective intelligence". Dennett's views on personality also have a special flavor due to the fact that he emphasizes this distributed image both regarding the formation of biological organisms and regarding their working. Design is postulated no more to be at a single place (be it Ego, Creator, or a Supercomputer) but it is assumed to be distributed over the entire system.

18. COMMUNICATION PATTERNS
AND COGNITIVE ARCHITECTURES

The concept of architecture

One of the leading ideas in present-day cognitive science is the recognition that human cognition is characterized by special structural constraints that are referred to as mental architectures. These are assumed to be constraints, on the one hand, and structural aspects of information coding, on the other. The notion of architecture covers issues like:

– the knowledge types used (propositions, images, skills);
– their temporal parameters;
– and internal organization.

In a sketchy way, one is entitled to talk about biological, more fundamental architectures, on the one hand, and newer ones, on the other. Their coexistence in the mind is responsible for the realization of the entire human architecture. Some proposed features of these two types are outlined in **Table 18.1.**

Table 18.1. Primitive and newer mental architectures

Primitive architecture	Culture, modern architecture
Evolved	Unbound
Fixed	Flexible
Fast (ms, s)	Slow (minutes, hours, years)
Formed over millions of years	Centuries, decades

These structural determinants are characterized both on the individual level and on the level of human groups by characteristic formation and processing times. A short summary of these is given in **Table 18.2.,** in accordance with a classic view (Newell, 1989). The table indicates that there are very fast procedures to deal with information that took millions of years to evolve, which are formed relatively early at the individual level, and there are newly formed ones that take a longer time to unfold in the individual as secondary networks.

Table 18.2. The temporal scale of human actions according to Newell (1989)

Domain	Function time	Evolution time	Individual formation time
Biological, neuronal nets	$10^{-2} - 10^{-4}$ sec	Millions of years	Years
Cognitive, acts, actions	$10^{-1} - 10$ sec	Centuries	Hours, years

Present-day information technology raises the question whether the new tools that simplify our life, and at the same time make our life more vulnerable, e.g., as regards our time structuring, also lead to the formation of new secondary architectures by changing our way of thinking.

Many classical philosophical and psychological arguments are raised in this context, and we are basically faced with questions having a distinctly Enlightenment flavour. A traditional issue along Humboldtian lines is whether language is primarily an internal, intimate reality, or a medium of communication. This traditional issue of internal or external determination is rephrased as the issue of the primacy of new communication devices in determining thought. Do new communication tools and their respective protocols change human mental life? In fact we have to realize that regarding the relationship of communication media and architectures, two visions are entertained today. These are portrayed in **Table 18.3.** as the opposition between the external and internal determinations of thought.

Table 18.3. Two visions of mental determination and communication

Inward	Outward
Socialization	Innate structure
Interiorization	Expression of thought
Relativism	Universalism
Tools are decisive	Tools are but instruments

The first extreme position is the strictly modular view as proposed by Fodor. It holds that all mental architectures and even contents are innately specified (Fodor, 2000). According to the extreme cultural relativist view, on the other hand, all architectural aspects are rewritten by external cultural influences. Most present-day ways look for a compromise regarding the variability and changeability of architectures. It is assumed that some relatively stable processing modes exist, but some parts of the entire architecture are under the influence of cultural domains. There are strong biological architectures, and culture has an impact only on the higher, output levels of these computations and cannot rewrite everything.

Modifications of architectures: The proposals of Merlin Donald

One of the most comprehensive proposals encompassing biologically given architectures and at the same time emphasizing the formative influence of culture was made by Merlin Donald.* The uniqueness of the approach lies in the fact that Donald assumes correspondences between communication and representation, external and internal worlds. Neuropsychological organization, the world of communication and economy in memory all have a place in his interpretation of architectures. **Table 18.4.** gives a summary of his views extending towards present-day knowledge vehicles.

Table 18.4. The conception of Donald on changes in systems of representations and cultures

Culture	Species, age	Memory organization	Transmission
Episodic	apes, 5 million yrs	Episodic events	None
Mimetic	Homo erectus, 1.5 m yrs	Body representation Social enactment	Enactment, imitation
Mythical	Homo sapiens sapiens 100 – 50 yrs	Linguistic semantics	Myths, narrative knowledge and transmission
Modern	modern humans 10 000 yrs	External storage Hierarchical store	Fixed knowledge External authority
Gutenberg	Printing	Mass meme diffusion	Textual authority
Networks	10 years	Distributed in networks	Personal and impersonal

The general conception of Donald starts off far away from considerations of present-day communication patterns. He outlines a sequence of representational systems in anthropogenesis. The essence of the three systems of representation is a different organization and transmission of knowledge, namely mimetic culture, mythical culture, and theoretical culture. The primate mind is characterized by episodic culture. In episodic culture, knowledge is always personal and contextualized. The real human change appeared with the advent of a social semantics, with the appearance of shared knowledge, and thus an overcoming of the solipsistic mind. Mimetic culture was the first social system of knowledge, long preceding natural language, about 1.5 million years ago. It established a world of intentional representations through the body, entailing an open generative system, with communicative intentions of a referential nature, using internally reproduced representations. Its domain is visual and motoric, involving

* The original proposal was outlined in Donald (1991). The new version of the exposition gives a detailed consideration regarding the newest developments in neuroscience and the evolution of the mind (Donald, 2001). Donald (1997) provides us with his own interpretation of how his theory relates to the issue of historical plasticity.

beside hand gestures the use of body posture and facial expressions. Its neurologiocal precondition is a relatively precise representation of one's own body and the outputs of the episodic system.

As regards the cognitive architecture, mimetic culture implies a more precise control over our own body, with executive functions being able to "turn inward" as well. "Attention had to be redirected inward, away from the external world, and toward their own actions." (Donald, 2001). This means that the perceptual world and mind of the primates was replaced by an action-oriented world in early hominids making action the object of tradition.

From then on, concepts became shared, distributed. Social play, organized teaching, systems of transmission are born, as well as coordination through communication and joint representations, like in social hunting.

Mimetic culture at the same time was very conservative and slowly changing. The reason for this was that mimetic culture always required an episodic anchoring, its contents being provided by contextually bound episodic knowledge.

In the route towards natural language, some additional neurological changes were required sound to make based communication possible. These changes are summarized in **Table 18.5.**

Table 18.5. Cognitive/neurological preconditions of natural language according to Donald

Cognitive function	Its role in language
Working memory	Lexical learning, sentence parsing
Divided attention	Lexical learning, contextual interpretation
Cortical plasticity	Life-long learning
Increased long-term storage	Word storage
Growth of semantic brain parts	Richer contextual meaning

A sound-based language also implies a culture characterized by faster social changes. Donald refers to this as *mythical culture,* due to the prevalence of narrative language use in the early stages. The dominant new organization of knowledge is through action and protagonist-oriented narratives. Integrative myths of a group are an outgrowth of narrative patterns. Narratives are essential for change as well. "On a cultural level, language is not about inventing words. Languages are invented on the level of narrative, by collectivities of conscious intellects" (2001, p. 292).

The third turn was established by a formation of theoretical culture that involves the discovery of external storage mechanisms. Writing embodied this external storage space. In episodic, mimetic and mythical cultures, knowledge was basically represented in the brain of an individual, though regarding their origins in language-based (mythical) culture, they certainly were of a distributed social nature. With the advent

of writing, they became social systems independent of us, thus establishing a division of labor between our own working memory system and the external supporting memories. External memory can be realized in many physical forms, it is unbound, stable, and in principle always accessible. This *in principle* is, of course, questioned by the long stories of sacred knowledge, censorship and the like, and in a way, the modern network-based knowledge carriers in fact propose that network-based knowledge provides for real constant accessibility. But compared to our individual brains, books are certainly a more accessible system. Writing creates a system that with the new organization of knowledge lead to new epistemologies and visions of knowledge in general (Nyíri, 1992). From there on can we talk about a symbolic theoretical culture that will become the main governing principle of formal education with the image of a noetic system that has an independent existence. According to Donald, due to writing, our mental apparatus is relived from overload: at any given occasion it has to contain only some arrows pointing to relevant external memories, and sometimes the written "frame" as an external aid carries allusions to internally stored locations.

Representational changes are the moments that allow us to better understand the relations between brain reorganization and hominid evolution. According to this vision – like the one proposed by Lurija and Vygotsky in the 1930s (A. R. Luria and L. S. Vygotsky, 1992) – higher cortical functions are subjected to cultural organization. "We are a culturally bound species and live in a symbiosis with our collective creation. We seek culture, as birds seek the air. In return, culture shapes our minds, as a sculptor shapes clay" (Donald, 2001). This creates a peculiar bridge between biology and culture.

According to Donald, the four cultures do not replace each other, but create inclusive relations. It is this inclusiveness that leads to a new kind of consciousness, self-organization and creativity in communicative and representational systems. Creativity, as it was emphasized by many, is the ability to overhear between otherwise separated systems. In the framework put forward by Donald, this appears as the option provided by mentally coexisting cultures.[*]

According to Donald, the peculiarly human development leads to the birth of *hybrid minds* who live in *cognitive communities.*

> *The evolutionary origins of language are tied to the early emergence of knowledge networks, feeling networks, and memory networks, all of which form the cognitive heart of culture. Language was undoubtedly produced by Darwinian selection, but evolved indirectly, under conditions that favored hominids who could make their shared cognitive networks more and more precise. ... [the]*

---

[*] A traditional example of creativity as a crosstalk between otherwise separated domains is provided for the case of scientific discovery by Frederic Bartlett (1958) in his book analyzing great structural discoveries by people like Helmholtz. Similar visions were entertained regarding all aspects of creativity by Arthur Koestler in his book *The Act of Creation* (1964). This logic is extended now to the issue of antropogonesis by other people beside Donald. Steven Mithen (1996), for example, claims that the human mind is characterized by a crosstalk between very general types of originally isolated, modular intelligences, such as social, technical, naturalistic, and communicative intelligences.

emergence of language could not have initially been and end in itself… The first priority was not to speak, use words or develop grammars. It was to bind as a group, to learn to share attention and set up the social pattern that would sustain such sharing and bonding in the species.

The great divide in human evolution was not language, but the formation of cognitive communities in the first place. Symbolic cognition could not spontaneously self-generate until those communities were a reality. This reverses the standard order of succession, placing cultural evolution first, and language second (Donald, 2001).

Architectural changes and contemporary information society

The permissive visions provided by Donald that are designed to find some compromise between external and internal attitudes allow for a new look at contemporary information society and at the issue of possible architectural changes related to this. **Table 18.6.** presents some descriptive contrasts regarding these systems, contrasting formal knowledge systems.

Table 18.6. Traditional and network-based knowledge systems

Traditional	Network-based
Decades of learning	Fewer years in school
Slow access	Faster access
Knowledge as property	Distributed knowledge
Certainty an elaborated property	Certainty being formed now

Rather than surveying all the possibilities of the new communication, I would like to highlight some essential issues that, beyond the enthusiasm created by the new tools, are of fundamental significance for a cognitive psychologist. In a way, this should be interpreted as a continuation of the issues raised by Donald to modern society.

External–internal relationships. The traditional two visions, the inward and outward visions on the relationship between culture and the mind summarized in **Table 18.3.** do show up in the middle of electronic communicative changes as aspects of users and creators. With regard to *users,* e-communication shows the success of centripetal thought: we use new messages and exchange our thoughts in this way. Communication directs human thought, and its changing patterns change our thought, too. Under the impact of new communicative surfaces, we become, as emphasized by many, less linear, more image-oriented, and we recognize the laws of imaged-based thinking (Nyíri, 2001).

The situation seems to be different, however, regarding the creators of new communicative forms. In *creators,* the emphasis is on creating new representations, and not

on their communication. This is true both for minor details of technology and in the creation of fundamentally new systems (user surfaces). It is exactly this start from ways of thought that allows communicative innovation on the part of the users. This very asymmetry exists indeed not only on the level of noisy phrasings by sociologists and cultural critics (meaning that the new media carry hidden contents and make us slaves of certain ways of life), but it shows up on the quieter level of cognitive architectures as well. Communication shapes thinking in most of us, but rapid technological change makes even clearer the presence of an inverse process: we can as well shape our systems of representation.

Initiation and passivity. All of this directly touches upon the issue of our activity in the world of the new media. Certainly, as users we are passive compared to the R&D people: our frames are received as givens. However, this is the case even with natural language. Thus, the division is not as new as first thought of. At the same time, we are initiators in many respects: network search itself, for example, is a rather active and initiative process contrasted with waiting to be served in traditional libraries. Even within the same domain, that of the screen, one can identify an entire scale of activities.

Researchers, just to take a well-researched minority in the world of electronic correspondence that seems to be passive since it easily connects us to our childish dependency circles, find a channel that is free both financially and personally, compared to traditional correspondence. Electronic correspondence as a next step facilitates the creation of new scientific communities where language becomes an important virtual "niche creator". This virtual horse riding, however, brings up the danger of fantasy-dominated architecture, the danger of never growing up and creating a world of electronic Don Quijotes.

Some empirical data on the use of new electronic media

Our pilot investigations on the use of electronic media indicates, however, that the instrumental and dependency-related uses are distinct clusters. Analyzing the communicative habits of a frequent internet user group, factor analysis showed a profile presented in **Table 18.7.** (Krajcsi, Kovács, Pléh, 2001).

The different factors presumably imply different motivational needs. One of the main functions seems to be browsing that is independent of the other uses. This function is characterized by search for information contrasted with entertainment. The second function is e-mail that mostly implies communication with known partners. The third function implies uses that mainly characterize internet-dependent people, including chat and correspondence with unknown partners. It is noteworthy that the factors do not group possible uses simply according to technical options, but according to motivational factors. Mail, for example, is divided into two factors depending on whether it is with known persons or with "strangers", since these two uses imply different needs.

Abstract world and real people: Don Quijote in the world of today. Regarding new communicative media, it is emphasized that these tools focus on virtuality, promising

Table 18.7. Internet use functions. Factor-loadings of different functions

Browsing–information seek	Mail–communication	Entertain–dependency
Browsing in general 0.85	E-mail – known person 0.91	Chat 0.81
Browsing for information 0.81	E-mail 0.88	E-mail – unknown person 0.76
Browsing for entertainment 0.71		

freedom. The virtual world creates inner and outer roads of unknown dimensions, it thus carries a vision of freedom. One travels to places and libraries one could not only lack the ways, but also the time to do so.

This freedom is the positive side: it can be seen from e-commerce to travel sites in many respects, including the world of research as well. But as the fears concerning multimedia consuming children already indicated, there is an other side as well: the threat of losing reality control. This is the problem of Don Quijote, since the noble Spaniard suffered from being a victim of virtuality at the dawn of the printed word. We are familiar with this problem from our adolescent times: after a few years of escape into the bookish world, we start to wish to escape to our real world, to make real trips and to turn to real persons, like real girls.

Thus, the worry is not new. It is new, however, that in this transformed world the ratio of secondary information, of virtualities is rising. We observe life paths where virtuality becomes reality. The new world of communication certainly changes our way of life, thereby rearranges the relative weight of our motives. Some of us become dependent on our tools, and at the same time, the new Don Quijotes try to get away towards objects, towards nature and real life. Time has a central role in this process.

Emotional time: The issue of time management. The logo of the world of new media is *constant availability.* It is a commonplace sociological truism that the new media leads in certain strata of society to a mixing of work and private life, and to new types of interaction-based alienations. Due to our participation in the system, we ought to have open channels all the time, but we would sometimes wish to switch off entirely. But then we would become non-entities even in our own eyes. The psychological issue that touches architectures and mentalities seems to be simple: in order to regain our personality, we ourselves may regulate again our communicative patterns, and reconsider how much time we spend on what. A simple aspect of this is how much time we spend on *finding and obtaining* the constantly refreshing pieces of knowledge (search and paste), and how much time is spent on *using these pieces of valuable information.* There is no easy solution, but there is certainly an intellectual task and a social problem that touches on the ecology of mental resources.

Figure 18.1. shows the communicative time dynamics of our select group from our empirical studies already mentioned.

It seems to be that mornings are for business, and evenings are for private matters. That should not surprise anyone. However, with sms and e-mail, two hardly noticeable uses, we are likely to care for our private matters at any time of the day.
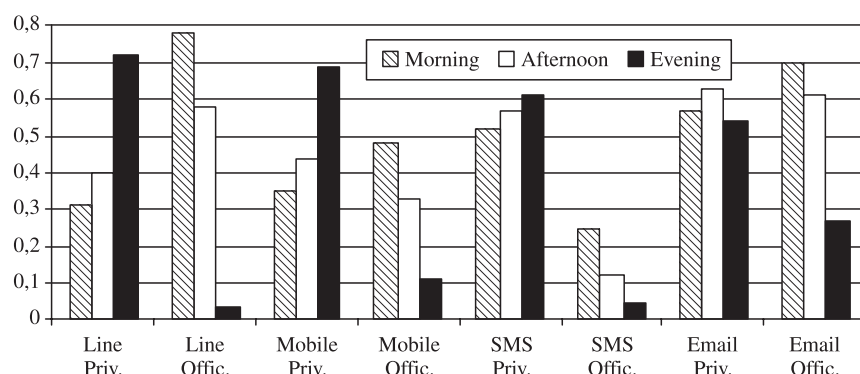
Figure 18.1. Communicative media use according to daily schedules in regular internet users

Relations between knowledge and skill. The new media force us to reconsider the role of explicit knowledge in the formation of the human mind. The amount of knowledge which has to be packed into the user can be imagined as a moving encyclopedia? The weight of skills increases relative to the weight of knowledge when not only "sacred books" are the social storehouses of knowledge. Learning obsolete knowledge becomes questionable. However, if skills are elevated to the High Table then what do these skills operate on? These are issues of a psychological and educational nature, (Dienes and Perner, 1999) and they are with us for at least a century as the debate between conservative and progressive curricula. The issue of the new media reactivates the debates since new communications are a skill-based entry to stored knowledge according to some, and according to others, it mainly turns us away from the accepted canons.

Teaching methods. Life-long learning is not merely a social issue related to the workplace market. Humans are unique in the animal kingdom by being instructional creatures. The traditional organizing frame is vertical transmission of knowledge, in a relatively stable environment. This went together with skill formation and even explicit knowledge transmission in our bookish culture, being limited to certain early ages, even with growing life expectancy. With the rapidly changing environment, with growing life expectancy and new communicative patterns, not only does lifelong education appear, but the importance of horizontal transmission also increases. This implies learning and teaching to be more fun as well as to involve new tensions. Society in fact is not prepared to deal with this issue, but some retraining and supervising fractions of it (such as psychotherapy, language teaching, and the like) have accumulated knowledge in this area. We should learn from them how to deal with the need to learn.

New media and old ethological constraints. Beside the entirely internalist and entirely externalist views of the mind, there are some trends that emphasize that even the most modern technologies in a way become accepted and widespread because they somehow become harmonized with the ethological constraints of the mind. Theoreticians in this group believe in the stability of biological systems that can only be slightly modified by new technologies. Evolution built some quite stable needs and

possibilities into human beings that cannot be changed by cultural influence. The nightmare of Orwell cannot be realized because human beings are unable to suffer from loneliness or restriction of information spread for longer periods of time. Along these lines, Dunbar describes several examples of chat rooms that fit into long-established motivational and cognitive systems. In our research, we intended to provide some empirical evidence for this otherwise strongly theoretical debate through a survey about the communication habits of internet users. But this is also true for sociological theories that show how the wired net can be interpreted as a sociological network (Dunbar, 1996, and Wellman, 2001).

Theories of secondary orality (Nyíri, 1992) and the re-personalization of technological communication patterns implies that the new media use available old tools of network formation building with traditional tools of an inner world which become very much new due to cognitive ecology. The task of the scientist here is to analyze the universal aspects of this process. In order to do this, there is a need for more crosstalk between disciplines, and communicative tolerance, as regards what exactly these new tools were meant for.

As naive everyday users, we are already aware of the variability of our tools. **Figure 18.2.** shows that regarding speed, personal touch, and trustworthiness, we are by far not naive users of our own tools.

There is of course still a long way to go until we become as flexible and versatile in our science dealing with communicative media as we are in our subjective judgment, and in our mental architectures.
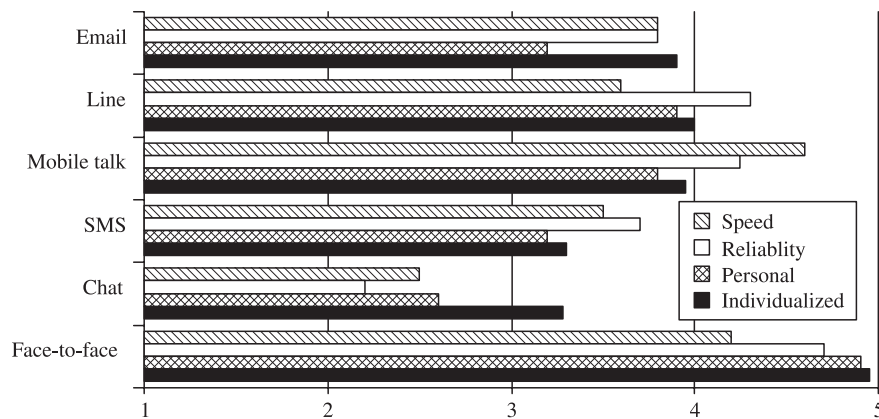
Figure 18.2. Relative ranking of different communication channels on different scales

230

19. REPRESENTATIONAL SYSTEMS, SELECTION, AND THE DIFFUSION OF IDEAS

There are several ways to approach one of the central topics of present-day cognitive science, psychology, and philosophy of communication, namely the relationship between the dramatic communicative changes in contemporary culture and society and the organization of the human mind. In the framework of the project *Communication in the 21st century,* examples can be found for all of the possible approaches. Thus, for the sake of brevity, I shall present the different approaches relying on these examples.

1. One can analyze contemporary changes considering possible similarities between recent changes in information technology and dramatic changes of communicative architectures during hominid evolution and during the great changes of human culture. Considering the origins of cognitive architectures, one can talk of biologically-based ancient and newer architectures that coexist in our mind realizing the full human architecture. Several approaches claim a compromise regarding the flexibility of architectures. They assume that we have relatively fixed modes of solution, while there are architectures under the impact of cultural and communicative media. According to the middle of the road approaches, culture has an impact on the higher levels of cognitive architectures. Culture cannot rewrite everything, but it still has a strong influence on creating secondary architectures. Part of this claim is, of course, the proposal that present-day IT tools also have an impact on our thinking by forming secondary architectures (Donald, 1991, 2001).

The approaches using the concept of architecture which has its origins in computer science find a new way to express the classical proposal that language is a medium of thinking. According to the new proposals, representational and comminicative systems co-emerge and also change together. In these frameworks, both existing biological architectures and the peculiar way of cultural shaping of architectures of communication and representation are combined. External and internal world, neuropsychological organizations and cultural systems are presented and interpreted together.

2. Present-day IT tools also raise the issue *whether these new tools change our world of feelings and our organization of life,* creating changes in epistemology, knowledge structure and time management similar to the ones introduced by the discovery of writing and the invention of printed type (regarding the latter think of the world of Don Quijote) (Nyíri, 1992).

Let us now survey a few issues regarding network use with an eye on the emotional and relationships aspects.

Outer and inner. Regarding the *users* the new IT shows a superiority of the centripetal way of thinking. We acquire knowledge to deal with the new media, thereby changing our thinking. Communication would direct, govern thinking, and its changes would change thought as well. In the case of the *creators,* however, the emphasis is on producing new representations, rather than communicating them. This asymmetry between users and producers provides plenty of foundations both for the optimists and for the pessimists. In most of us, communication drives thought, but sudden technological changes make the other aspect clearer than ever as well: we can as well change our systems of representation.

Initiatives and passivity. The above issues directly touch upon the problem how active one can be in the world created by the context of the new media? On the one hand, as users we certainly are passive compared to the creators: we are using ready-made frames. On the other hand, we are initiators in many regards. Network search itself is a very active, initiative process compared to library services requested. Our preliminary Hungarian empirical data imply a separation between the passive and the active uses of the new tools, thus we are by far not merely passive subjects of communicative openness.

3. The third approach starts off from the notion of architectures involved in the modern IT world. One of the foundational ideas of present-day cognitive science is the proposal that cognition is characterized by particular structural arrangements called architectures that provide for the structural organization of particular cognitive events and contents – images, words, symbols. The concept of architecture interpreted for contemporary communication entails issues such as the following:

(1) what knowledge types are used (propositions, images, skills);
(2) what their temporal parameters are (think of the different memory systems);
(3) what their internal organizations are e.g., whether they have a narrative or a categorial structure.

The present chapter is centered around three proposals:

(1) Ways of thinking are always connected to particular communication modes.
(2) In the patterning of ways of thinking and communication modes, particular analogies can be observed regarding evolutionary, developmental and cultural systems.
(3) Amongst the analogies between the different subsystems, peculiar causal interactions also characterize the systems. Their essence is that memory systems provide for a wider range of selection pool and broader representation.

Selection systems and representations

It is a basic idea in evolutionary biology, cognitive sciences, and even in contemporary cultural studies that mechanisms of change are characterized by a two-step Darwinian cycle. This extended cycle was proposed by the first theoreticians of evolutionary epis-

temology, especially by Karl Bühler, but even earlier by Ernst Mach (Bühler, 1922, 1936; Mach, 1910; Pléh, 1999). The essence of these models of change is the proposal for optimized mechanisms of change where novelty-generating and selectional phases are somehow separated. The first phase is responsible for creating new reactions to environmental challenges, while the second phase is responsible for adequacy, for the accommodation to the environment. The basic version is Darwinian selection, the evolution of species by mutation and selection. One version of the more flexible, and behavior-based models is the selection-based theories of learning and development. Since the time of Bühler and Karl Popper, three basic cycles of this model are distinguished:

(1) Darwinian selection cycle. Changes here are very slow, since the generators of change are random mutations, and changes involve high risks. In Darwinian selection as Karl Bühler first expressed it, our fate is at stake.

(2) Learning mechanisms. The first description of changes belonging here was the observation of trial-and-error learning by Thorndike (1898). On the basis of environmental feedback, from the many solution attempts produced from the reaction repertory of the organism, the ones leading to success (obtaining food, obtaining the praise of the teacher) lead to the stabilization of adaptive, fitting habits. Here, the goal is the mere survival of the individual. At the same time, since they are based on neural mechanisms rather than on changes in the genome, changes in this cycle are much faster. Contrasted to the Darwinian mechanism lasting for thousands of years even in case of a single behavioral trait – the rule of thumb being here that 300 generations are needed for the fixation of a genetic behavioral change. In learning, changes may occur in the magnitudes of hours, or, in higher mammals in the magnitude of a few minutes.

(3) Thinking. Humans, and to a certain extent non-human primates as well form particular representations of the world. These mental representations either correspond to the world or not. At the same time, mental representations due to their structural features lead to newer and newer representations. Thoughts in a way tend to have their own life. These representations are able to direct our own behavior. The precondition for these effects is for them to have some correspondence relation with reality. Several non-solipsistic social systems provide for this, from a fourth cycle, from the world of culture. Considering the mechanism from within, it seems to be the case that the thought- or idea-based selection system is able to move in the fastest way, in a predictive manner as well. We make plans about the future, we are able to reinterpret situations exactly due to the strength and autonomy of the representational systems. While learning requires hours/minutes, for insightful understanding – once we have the representation systems – sometimes seconds are sufficient.

(4) Culture. It might seem strange to interpret culture as a selection system. Still, several broad theories try this strange move exactly. Culture might be taken as a system where different varieties are produced, and in the world of integrative mechanisms of culture, in the context of social communication, some of them are taken as valid, some as invalid. One can look at entire cultures as well, and talk of Hungarian, Japanese, French culture as an evolving selection system. Let us rather look at mental organizations within a given culture. A new procedure submerges somehow to cut sheets of paper, for example. This procedure becomes accepted in cultural selection

233

when others are able to imitate it with ease and in an unequivocal and reliable manner. Several mechanisms control this process. There are parallel rational considerations, coming from the third cycle, based on mental representations, and merely habit-based processes arising from the second cycle. Culture, on the one hand, can be interpreted as a subsystem that combines blind habits based on cycle two with rational insight and representation-based insight of cycle three. This combination is either based on imitation, or on rational argument.

One can take a reversed vision of the cycles as well. Starting from cycle four, from culture, one can claim, for example, that some subsystems, such as science, create socialization patterns directing the learning systems of cycle two to the world of thinking that corresponds to cycle three. We teach the new generation to read and write and count, in order to provide them with representational systems that allow for faster mental selection and more efficient planning.

The relationship between levels of selection since the time of Charles Darwin is anti-Lamarckian. No inheritance of acquired characteristics, not even in the domain of behavior. Results obtained in selection cycle two, through individual learning and knowledge accumulation, can in no way have an influence on cycle one. At the same time, characteristic interactions take place between cycles two and three, as well as three and four. Several proposals today, the most notable among them being that of Tomasello (1999), and Gergely and Csibra (2001), claim that a striking feature of humans, in contrast even to other primates, is the teaching attitude. We are a teaching and learning species, prepared to learn from our seniors and teach the juniors, from early on we apply a pedagogical stance, as Gergely and Csibra (2001) phrase it. This means that in the selection system of cycle two, we have peculiar expectations for inputs coming from cycle four, from culture. We have expectations that "someones" will direct our learning systems according to comprehensive systems of expectation and the world of thinking, and cycle three will come through this teaching–culture interaction. Starting from the theory of culture one could also raise several arguments to the effect that modern man – modern meaning now Western people of the last few centuries – has a characteristic feature in fitting his individual learning mechanisms into a broader and broader cultural system. One of the advantages of modernization would be the move of culture towards creating more and more subsystems that allow for a wider control over cycles two and three, i.e., over learning and thinking. This directing influence, as Donald (1991) has outlined it several times, means that the representational systems arising from cycle three have an influence on individual learning and information processing mechanisms. According to the conceptualization of Donald, these subsystems create cultures of different types, and this is the framework of having feedback from cycle four to cycles three and two.

Images, ideas, sentences

It is a triviality from classical rhetoric, from the time of Quintilianus on that the essence of signs is that they stand for something or for someone. The scholastic theory of intentionality refreshed in late 19th century in the work of Brentano started to put this rela-

tionship into the center of representational thinking (Brentano, 1874). Modern cognitive science took up the path of Brentano a century later, in the 1970s. The essence of the representational theory is the proposal that in thinking we always have to do with relations between signs. These signs usually refer to something in the world, but at the same time have a peculiar relationship to each other. From a given sign, the validity of other signs follows. In representational systems – to allude to the famous argumentation of Jerry Fodor – causal and implicational relations both hold. From the truth of the sentence *Frankie forgot that Mary closed the door* logically follows the truth of the sentence *Mary closed the door*. This is, however, not a causal consequence, but is derived from the structural and meaning relations between the sentences involved. Similarly, if, on a figure, C is above B, and B is above A, it follows that C is above A. This is not some kind of causal relationship between the propositions about the figure, but comes from the structure of images themselves (Fodor, 1990)

One can conceive 20th-century philosophy and psychology starting from the representational relations that the different schools entertained. Some claim, of course, that there are no representational relations whatsoever. Let them be labeled mean behaviorists. There are others, however, according to whom representational relations are principally of a linguistic nature. This attitude was true for classical philosophy of language, and for early modern cognitive science as well. This is referred to today as the syntactic theory of mind. Human thinking is interpreted as a merely formal system. In a syntactic engine, sentences lead to other sentences, and in our mind propositions lead to other propositions. Ideas themselves would be organized in a sentence-like manner (Fodor, 1975). This is a propositional theory of the human mind which could aptly be called, following the function-like proposal about logical structure advanced by Gottlob Frege, as the Frege model of human thought (Frege 1980). From the early 20th-century on, this is contrasted by the theory claiming that the basic vehicle of human thought would be *images*. Thinking is always image-like, and the sensual content of images carries meaning (Nyíri 2003). The two theories had characteristic debates in several areas. Regarding evolution, images somehow have to come before words. The rivalry is true for ontogenetic development as well, where according to Jerome Bruner, and in a more modern version, according to Annette Karmiloff-Smith, image-based thought would precede linguistic thinking (Bruner, Oliver, and Greenfield, 1966; Karmiloff-Smith, 1992). There are alternative views as well. According to Piaget, for example, one has to overcome the debate over the primacy of sentences and pictures to arrive at an action-operation-based logic (Piaget, 1962). I do not intend here to make an attempt to choose between these rivals. It is important to remember, however, that in discussing relationships between representation and communication, it is a traditional issue to decide whether in instructional settings representational systems arise from social-communicative interactions. There are many doubts regarding a strictly communication-based view of representational systems. This is clear enough in the case of sentences and images. In the case of images and sentences, the visual and linguistic world may be taken – along with an innatist epistemology – as a mere occasion to develop a particularly pre-wired human representational system. One crucial aspects of this is the role played by human memory systems in connecting cultural systems with individual selection cycles.

Memory systems and representational systems

Memory systems are usually interpreted with reference to individuals. Contemporary memory research helps us to understand better the relationship between the different systems of selection. There are two distinctions of consequence to be made here. The first one is the relationship between working memory and long-term, lasting memory. Working memory systems, as short-term processing systems, are able to move influences from cycle four, from culture through cycle-three representations – to cycle two, i.e., habits. Thus, working memory systems are able to mediate cultural influences through personal interactions towards individual representational systems and habits. In the selection cycle of individual learning, working-memory systems provide for the interaction between individual perception and the valid cultural context. Just think of color perception and color words. Things stored in cultural memory, such as words for colors for example, can become parts of the individual long-term store through the working memory system. On the other side, with respect to functioning, culture provides for a constant refreshing of our knowledge base to remind us in the form of 'allusions' to our commitments and to what kind of cultural canons we intend to cultivate. Working memory activates sketches in our mind, the supplementary part of what are present in the cultural memory system.

Due to these interactions, different memory systems form a memory hierarchy from biological to cultural memory in the sense of allowing us as living creatures to become liberated from the demands of here and now. Working memory broadens the temporal scale and is constantly refreshed, evolves into autobiographic memory. On the other hand, thanks to our interaction with semantic memory, this store of timeless cultural knowledge memory takes us to distant places and the distant past. In this regard, one could say that contemporary IT, by providing for global access, represent an even newer liberty dimension of memory. Access means here, on the one hand, that due to certain systems of access, due to electronic mail and mobile phones, we ourselves are constantly accessible. On the other hand, some knowledge systems are constantly accessible to us. We can take a look into the world of "the lexicons", any time and anywhere. This frees our individual memory and we gain further capacities.

Mechanisms of social integration and representational systems

A key issue in the relationship between representational systems and selection-based systems of change is the mechanisms of spreading representations. Here one can find an intriguing combination of network theories and tinkering-based memetic theories. According to the original proposal of memetic theory, thoughts spread in a peculiar way, like diseases, under the impact of two factors (Dawkins, 1976). These two factors are psychological attraction (how good a story is) and the appeal of the source (who is important?). These two factors, however, were studied by traditional social psychology for decades. Reference-group theory, and the study of opinion leaders, as well as the *hub* notion in present-day network theories all emphasize similar issues. All tend to claim that in spreading systems, there is a kind of optimality provided by two-step

models or arrangements where crucial individuals or hubs do exist. It is an intriguing issue to wonder whether the hub models would hold for our internal mental world as well. How does representational integration within the mind take place? Are we able to use relevance-based integration as claimed by Dan Sperber (2000), thus allowing for rationality, or is internal integration merely habit formation like the diffusion of memes? This is an issue for the next years. We have to look for the place of freedom and rationality in a more and more wired world.

20. AUTONOMY OF THE ARTS
AND THE MODULARITY ISSUE

Different meanings of autonomy regarding art

Autonomy, of course, can mean several different things regarding art. All of these different meanings and approaches have their non-autonomy counterpart. In all approaches, both the autonomy and the dependent views existed for a long time and they are with us even now.

Social autonomy

Art is autonomous regarding social life: it has its own laws and it is never a simple mirror of social forces. This is the idea professed by different versions of the *l'art pour l'art* notion, and it is even mirrored in otherwise social and community-based approaches to literature, like the "autonomous principle" idea of literature promulgated by János Horváth, a leading Hungarian theoretician of literature in the mid-twentieth century. The basic proposal of the theory is that literature has its own laws or own form of communication that cannot be reduced to other aspects of communal life.

The idea of social autonomy is inherently or openly challenged by the different milieu-based interpretations of art, and of course, most visibly in mid-twentieth century, by proponents of a Marxist historical approach to art.

The debate regarding this type of autonomy mainly concentrates on the issue of determinism: what determines changes of art and status of art in society.

Functional autonomy

Another possible type of autonomy is autonomy regarding the function of art in the life of the community and the individual. One could rephrase a Kantian approach to aesthetics and claim that the issue of beauty and non-instrumental use is a critical prob-

lem for biologically-oriented theories of art. One can propose that art has its own functions having no direct relation to adaptation and sexual selection, while it may still have broader functions such as practicing categorizations (Sebeok, 1979), contributing to a tonic balance of higher neural activity as proposed by followers of Berlyne, 1971 (Martindale, 1990; Cupchik and László, 1992).

A critical opponent of this type of autonomy claim would suggest that art has to have an immediate transparent adaptive function. The functional autonomy claims in these debates are usually associated with claims regarding autonomy in the structure of the human mind.

Architectural autonomy

There is a third autonomy claim that should be my main concern here, namely autonomy in the sense of art being related to independent processing systems in the human mind and brain. Roughly conceived, this idea would suggest two possible, but necessarily contradicting ideas about mental architecture and the cognitive foundations of art:

(1) Art is a special form of cognition which is relatively independent of other forms of cognition. Therefore, the unfolding of art (art history) is a saga about the recognition of this autonomy.

(2) Art is part of a decomposed view of cognition. Art might relate to different aspects of experience, not necessarily to one single aspect. Therefore, the history of art is a history of experimenting about which aspects of (visual) cognition to connect to artistic expression.

In the following pages the main references will be made to version (2) However, regarding their opponents, these two architectural claims are rather similar. Both figure that art has a long history of struggle for independence, and this is true not only in the social and functional realms, but regarding the proper vision of our mental architecture as well. The opponent is the generalizing vision of the mind that presided over art history in the form of emphasizing penetrability and dependence of perceptual organization on knowledge factors, as represented by authors like Gombrich (1960).

Let us take a closer look at the different versions of the modular claim regarding the architecture of the mind and see how they could be, and indeed are, applied to art.

Modularity and the issue of interactions between knowledge systems

The modular approach to the mind provides one of the basic present-day frameworks to study human cognition. Over its career of 30 years, a basic frame with features was developed following Fodor's (1983) original proposals regarding mental architecture. Modules are supposed to be domain-specific systems of information processing that

carry out computations over special aspects of incoming information. In general, there is a division within the modular view on how specific these modules should be (e.g., a modular system for vision, or rather, separate modules for triangles, squares, circles, and so on.) However, even with these divisions kept in mind, there is a general consensus that domain-specificity covers not only elementary features like colors, shapes, and so on, but higher and more specific domains as well, like face perception, number sense, word retrieval. Domains and modules, thus, extend to areas that were preserved as domains of higher-order cognition (for an overview, see Hirshfeld and Gelman, 1994).

The features of modular systems, as outlined by Fodor (1983) are seemingly rather simple ones, as summarized in **Table 20.1.**, together with the arguments for their postulation.

Table 20.1. Some features of modular systems as proposed by Fodor (1983)

Basic feature	Arguments
Automatic, mandatory processing	Ambiguity: activation of irrelevant meanings
Fast, reflex-like	They are activated early on in processing, and act stupidly
Encapsulation	Modules are insensitive to other processors: they only interact on the output level
Domain specificity	Only process relevant information is considered
Innateness	They are activated early on during individual development

On the whole, during the last decade, three different versions of cognitive processing regarding modularity emerged, as indicated in **Table 20.2.** Each of these conceptions has its own counterpart regarding the architectural organization of art that I will label as Primacy of Autonomy, All Encompassing Autonomy, and the Crosstalk Between Modules view.

The primacy of the autonomy view

The general outline both of processing and of individual development according to this view **(Figure 20.1.)** assumes that autonomy is the starting point and this is followed by interaction, that is, by the penetration of background knowledge into processing.

These assumptions made some more or less explicit claims about organization in their respective fields: the knowledge-based (top-down) effects were assumed to be more loosely organized and later appearing everywhere as **Table 20.3.** suggests.

Table 20.2. Three different conceptions regarding the relationships between modules and general cognition (modified from Pléh, 2000a) (GPS = General Problem Solver)

Conception	Architectural ideas for vision	Vision of art	Main proponent/for art
Modules AND general cognition	Early vision followed by GPS and concepts	Art vacillates between modular and GPS-based visions	Fodor, 1983; Humphrey, 1999
ONLY modules	All of vision is decomposed	Schools of art capture different aspects of representation	Sperber, 2000; Zeki, 1999a, b
ONLY general cognition	Overall architectures and interactions	Art arises as a cross talk between functional modules	Elman, Bates et al., 1996 Gombrich, 1960
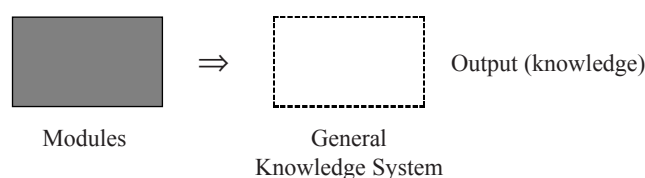
Figure 20.1. A simple modular view of processing

Table 20.3. Comparison of modular and General Knowledge-based Components in different fields

Modular	Knowledge-based
Processing (short times)	
Early (< 100 ms) components	Late (>200 ms) components
Ontogenetic development	
Early maturation (infancy)	Late maturation (e.g., preschool)
Evolutionary-historical development	
Evolutionary origin (millions of years), universal	Cultural (< 30 000 years), learned, variable

In this view, *autonomy is followed by interaction* (knowledge effects). For the arts, this attitude would see an interesting, almost circular development, where again autonomy would be already present at the initial (starting) stages, then it would lose its autonomy by the cultural development of knowledge-based or knowledge-penetrated systems, and the later development of modern art could be seen as an attempt to regain its innocence.

242

This view was most clearly proposed by Nicolas Humphrey (1999) in a claim that one key to understand specificities of early art is to analyze the relationship between different types of representations. Humphrey (1999) goes against the accepted view. According to the received view, prehistory and the birth of graphic representations in children-language and visual representations are but symptoms of a general increase in representation abilities. Cave art in this view is taken as evidence for language and other symbolic abilities, and in children, according to the influential theory of Piaget (1946) distantiated, deferred linguistic coding; dreams and graphic symbols are the symptoms of the emergence of a general representation ability.

According to Humphrey, however, the earliest art is characterized by the fact that visual representation *is not* influenced by language. This is why, according to him, the first representations in cave art would be so naturalistic, especially compared to later drawings, say, in Egyptian art. The first prehistoric artists would try to portray visual representation in their natural appearance.

> *The makers of these works of art actually have had distinctly premodern minds, have been little given to symbolic thought. Have had no great interest in communication. Cave art, so far from being the sign of a new order of mentality, may perhaps better be thought as the sang-song of the old.*
> (Humphrey, 1999, p. 1).

The style of this representation seems to be modular in two respects: it is sensual and not conceptual, and it is restricted to a given domain, namely animals. According to Humhprey, this latter feature might suggest that early language at that age was constrained to humans, and early graphic representations would only be grounded in the animal, non-verbalized domain.

The idea that this would suggest that this early, modular, autonomous art would be untouched by language comes from an analogy. According to Humphrey, cave art shows many similarities to drawings by an autistic talent, Nadia, as described by Sacks (1995). This child was not able to speak while she was making strikingly naturalistic drawings. Her situation, however, deviated from that of our cave artist ancestors: by being tutored by professional teachers, her drawings started to obey accepted canons of scholarly drawings, thereby losing their fresh, strictly visual character.

Historic art, as we know it, starts from conceptually penetrated shematic representations and then, at least in our culture, struggles to regain the original autonomy. This view is in line with the ideas that make a claim for a reorganization of the mind with the birth of culturally-mediated representations, and an important aspect of artistic development would be a conscious effort to regain this innocence and autonomy, as portrayed in **Figure 20.2.** Historically, art would first develop in the direction of portraying late integrative processes of visual experience that are influenced by experience, language and concepts. Much later on, however, from impressionism on, art would try either to regain its autonomy from conceptual representations by trying to target on earlier phases of processing, or to thematize this very embeddedness into conceptual knowledge from cubism on (about this latter interpretation see Hintikka, 1975). Art would have a genuinely cultural history. On the architectural level, this is indicated

a) **Prehistoric (cave) art**

b) **Historic art**

c) **Modern art**
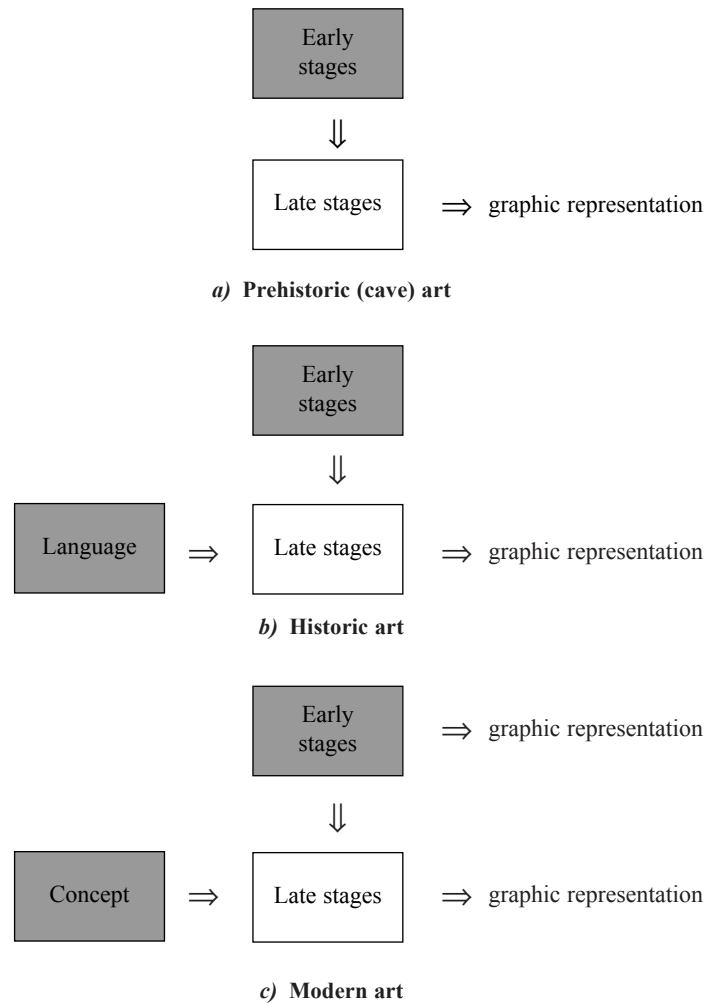
Figure 20.2. Three stages in the development of art regarding autonomy

by the idea that the biological processing system is supplemented by a more flexible social system. And the genuine social history would be a shifting balance between trying to grasp the internal in art. Modular components of vision, or trying to render visual experience in its integrity as it relates to meaningful, experience and language, infiltrated representations.

All-encompassing autonomy

Some approaches make a more integral claim that all cultural activities and culturally-mediated representations as well are organized in a strictly modular way. Even interpretation and other inferential processes, usually allocated to some non-modular

244

General Problem Solver would be assigned to dedicated modules, though these modules would be assigned to rather peculiar tasks, such as conversational inferencing, problem solving and the like (see Pléh, 2000 for a review).

There are two strong versions of this vision of the human mind. One is an evolutionary ultramodular theory. As Barkow, Cosmides, and Tooby (1992), as well as Pinker (1997) put it, the human mind is basically an assembly of a large list of specific adaptations, i.e., evolutionary modules that serve special domains and adaptational problems. This approach has its own critics. Fodor (2000) most naturally takes issue with the ultramodular view of the adaptationist theories and claims that there is still a need for a central processor that would give coherence to the orchestra of modules. Tomasello (1999), on the other hand, claims that rather than postulating a long series of special adaptations in hominid evolution, we may get away with postulating one single central modular adaptation, something like the ability to attribute thought and therefore an inner life to others.

The other ultramodular view is professed by neuroscientists. Zeki (1999b) among many others proposes such a view for the visual world. Visual representation would be the composite result of a large number of modular processes. Art in this vision would be a series of attempts to render different aspects of the variety of this multitude of processing. There would be no privileged type of representation for art to grasp. The artist would be peculiar in the sense that he would be trying to grasp processes and representations that are normally not available to conscious experience. Otherwise, however, art and science would be doing similar things: trying to decompose the complexities of visual experience. "Artists are in some sense neurologists, studying the brain with techniques that are unique to them, but studying unknowingly the brain and its organization nevertheless" (Zeki, 1999b, p. 10). Art would thus be the unfolding of a bioprogram, with its special, if you like, autonomous methods.

Zeki (1999a) even goes on to claim that there is a linguistic parallelism regarding the issues taken to be central between the traditional worries of artists, art historians and present-day neuroscientists. Art is a special effort to gain insight into the components of visual experience, and into how the brain constructs or computes the stabilities of the world.

As an actual proposal for art, this approach provides us with a rather peculiar image. Zeki tries to show that different artists experimented with the depiction of different modular components of vision, such as movement, color, shape, shading, and the like. For each neural mechanism isolated, he tries to find an artist who claimed the autonomy of this given visual feature. It is an interesting exercise, it is hard to see, however, any structure to the entreprise. Art would be an eternal struggle to gain insight into the constancies of visual experience in an ever changing visual world.

Ramachandran and Hirstein (1999) along the same line came up with more concrete proposals about the place of art in a modular view of the world. Basically, they claim that there are some simple economic laws of visual organization that make art possible. One is a preferential shift towards non-prototypical cases of a category. That would explain schematization processes in art. A second principle favors a grouping that may explain not only proportional features of visual art, but the emergence of representative art altogether. A third one is the preference for the increased activation in a single module. That latter one would explain the birth of "abstract art".

Crosstalk between modules

The approach of Mithen (1996) takes the opposite position compared to Zeki (1999a, b), though he does not deal as much with structural aspects of visual art as with the estimated original functions of art. In his vision about hominid development, millions of years of increasing modularization were replaced in the last 100 000 years with a *crosstalk between modules*. The specificity of the human mind is a new crosstalk between modules that allows for flexibility and creativity.

According to Mithen (1996), human language and many other inventions may actually have resulted from a loosening of boundaries between encapsulated modules, rather than from strengthening them. This line of thought supports the idea that all human specificities emerge by necessity as the result of an interaction between different "intelligences".

The multiplicity of modules is followed by a new age of fluidity. The view of Mithen regarding crosstalk between modules is in line with the image of hominid development proposed by Tomasello (1999). According to him, the crucial aspect of this evolution is not an accumulation of many small modular adaptations, but a central modular change involving Theory of Mind, social interpretation, and social learning. This would correspond to the idea of fluidity among the great modules proposed by Mithen. Mithen postulates four great modular systems he calls intelligences:

– natural history intelligence deals with animals and plants,
– technical intelligence deals with human artifacts,
– social intelligence deals with the behavior, emotions and mental contents of others,
– language deals with influencing the behavior of fellow humans.

Table 20.4. shows how the different human systems emerge as the combination of the different modules.

For the art theoretician and for the artist, this multiplicity of approaches to autonomy that relate the concept to modularity might not be too relaxing. In my view, however, the different approaches are not necessarily exclusive. While the modular ones concentrate on the structural organization of art, the crosstalk approach mainly concentrates on its function. Certainly, interesting new developments could be expected in the coming decade that would contribute to a general biological understanding of art in the framework of human mental architecture.

Table 20.4. Fluid crosstalk between intelligences and specific human behaviors

Human form	Natural	Technical	Social	Linguistic
Humor: animals as humans	*		*	*
Metaphor: artifacts as animals	*		*	*
Prejudice: other humans as animals	*		*	*
Art: signs made from templates to represent animals	*	*	*	

REFERENCES

Adorno, T.–Horkheimer, M. (1969): *Dialektik der Aufklärung.* Frankfurt: Suhrkamp.

Alexander, F. (1960): *The Western Mind in Transition: An Eyewitness Story.* New York: Random House.

Allport, F. (1955): *Theories of Perception and the Concept of Structure*. New York: Wiley.

Allport, G. (1968) *The Person in Psychology*. Boston: Beacon Press.

Anderson, J. R. (1983). *The Architecture of Cognition.* Cambridge: Cambridge University Press.

Anderson, J. R.–Bower, G. H. (1973): *Human Associative Memory.* Washington: Winston and Sons.

Angyal, A. (1941): *Foundations for a Science of Personality*. Cambridge: Harvard University Press.

Annin, E. L.–Boring, E. G.–Watson, R. I. (1968): Important psychologists, 1600–1967. *Journal of the History of the Behavioral Sciences* 4, 303–315.

Aron, R. (1967): *Les étapes de la pensée sociologique*. Paris: Gallimard.

Assmann, J. (1992): *Das kulturelle Gedächtnis*. München: Beck.

Baldwin, J. M. (1894): *Mental Development in the Child and the Race*. Methods and Processes. New York: Macmillan.

Baldwin, J. M. (1896): A new factor in evolution. *American Naturalist* 30, 441–451, 536–553.

Baldwin, J. M. (1913): *History of Psychology:* A sketch and an interpretation 1–2. London: Watts.

Barkóczi, I. (1970): A megismerési motiváció ontogenezise. [The ontogenesis of cognitive motivation.] *Magyar Pszichológiai Szemle* 27, 26–58.

Barkóczi, I.–Putnoky, J. (1968): *Tanulás és motiváció.* [Learning and motivation.] Budapest: Tankönyvkiadó.

Barkow, J. H.–Cosmides, L.–Tooby, J. (1992, eds): *The Adapted Mind: Evolutionary Psychology and the Generation of Culture.* New York: Oxford University Press.

Baron-Cohen, S.–Tager-Flusberg, H.–Cohen, D. J. (2000, eds): *Understanding Other Minds: Perspectives from Developmental Cognitive Neuroscience* (2nd edition). Oxford: Oxford University Press.

Barrett, L.–Dunbar, R.–Lycett, J. (2002): *Human Evolutionary Psychology*. Houndmills: Palgrave.

Bartlett, F. (1932): *Remembering*. Cambridge: Cambridge University Press.

Bartlett, F. (1958): *Thinking. An Experimental and Social Study*. Cambridge: Cambridge University Press.

Bastide, R. (1970) Mémoire collective et sociologie du bricolage. *Année sociologique* 65–108.

Beckett, S. (1987): *Waiting for Godot.* London: Chelsea House.

Beckett, S. (1931): *Proust.* Cited after the edition of 1987, London: J. Calder.

Békésy, Georg, von (1928/29): Zur Theorie des Hörens. *Physikalische Zeitschrift 29,* 793–810; *30,* 721–745.

Békésy, Georg, von (1960): *Experiments in Hearing*. New York: McGraw-Hill.

Békésy, Georg, von (1967): *Sensory Inhibition*. Princeton, N.J.: Princeton University Press.

Bence, György (1990): *Kritikai előtanulmányok egy marxista tudományfilozófiához.* [Critical prolegomena to a Marxist philosophy of science.] Budapest: MTA Filozófiai Intézet.

Ben-David, J.–Collins, R. (1966): Social factors in the origin of a new science: The case of psychology. *Amer. Sociol. Rev.* 31, 451–465.

Benedek, L. (1967): *Magyar pszichológiai irodalom 1945–1966.* [Hungarian psychological literature. A bibliography.] Budapest: Akadémiai Kiadó.

Bentham, J. (1789/1948): *An Introduction to the Principles of Morals and Legislation.* New York: Haffner.

Bereczkei, T. (2000): Evolutionary psychology: A new perspective in the behavioral sciences. *European Psychologist,* 5, 175–191.

Bergson, H. (1896): *Matière et mémoire.* Paris: Alcan. References are given to the critical edition: Oeuvres 1959, Paris: Presses Universitaires de France.

Bergson, H. (1923): *Idő és szabadság.* [Time and free will.] Budapest: Franklin. (Reprint 1990)

Bergson, H. (1930): *Teremtő fejlődés.* [Creative evolution.] Budapest: MTA. (Reprint 1987)

Bergson, H. (1991): *Matter and Memory*. New York: Zone Books.

Bergson, H. (1889): *Time and Free Will*: *An Essay on the Immediate Data of consciousness.* London: Routledge.

Berlyne, D. E. (1971): *Aesthetics and psychobiology*. New York: Appleton.

Bertrand, M. (1993/94): Les innovations dans la technique psychanalytique introduites par Ferenczi entre 1920 et 1930. *Bulletin de Psychologie* 47 (416), 496–501.

Bever, T.–Fodor, J.–Garrett, M. (1968): A formal limitation of associationism. In: Dixon, T.–Horton, D. (eds): *Verbal Behavior and General Behavior Theory.* Englewood Cliffs, Prentice Hall.

Bickerton, D. (1981): *The Roots of Language.* Ann Arbor: Karoma Press.

Bickerton, D. (1983): Pidgin and creole languages. *Scientific American* 249 (1), 116–122.

Binet, A. (1916): *Az iskoláskor lélektana.* [The psychology of school age.] Budapest: Franklin.

Binet, A.–Henry, V. (1894): La mémoire des phrases. (Mémoire des idées.) *Année Psychologique* 1, 24–59.

Binswanger, L. (1922) *Einführung in die Probleme der allgemeinen Psychologie.* Berlin: Julius Springer.

Black, J. B.–Bower, G. H. (1980): Story understanding as problem solving. *Poetics* 9, 223–250.

Black, M. (1962): *Models and Metaphors.* Ithaca, NY.

Blackmore, J. T. (1972): *Ernst Mach. His Work, Life, and Influence.* Berkeley: University of California Press.

Blackmore, S. (1999): *The Meme Machine.* Oxford: Oxford University Press.

Blackmore, S. (2000): The power of memes. *Scientific American* 283, October, 53–61.

Block, N. (1980): *Readings in the Philosophy of Psychology.* Cambridge: Harvard University Press.

Blondel, Ch. (1928): *Introduction à la psychologie collective.* Paris: Colin.

Blonskij, P. P. (1935): *Pamjat i mislenie.* Moscow: Ogiz-Socekgiz.

Bloor, D. (1982): Durkheim and Mauss revisited: Classification and the sociology of knowledge. *Studies in the History and Philosophy of Science* 13, 267–297.

Bloor, D. (1983): *Wittgenstein: A Social Theory of Knowledge.* New York: Columbia University Press.

Bloor, D. (1991): *Knowledge and Social Imagery* (2nd edition). Chicago: University of Chicago Press.

Blumenthal, A. L. (1970): *Psychology and Language: Historical Aspects of Psycholinguistics.* New York: Wiley.

Boden, M. A. (1977): *Artificial Intelligence and Natural Man.* Hasocks: Harvester.

Boring, E. G. (1942): *Sensation and Perception in the History of Experimental Psychology.* New York: Appleton.

Boring, E. G. (1950): *A History of Experimental Psychology.* New York: Appleton.

Bourdieu, P. (1984): *Homo Academicus*. Paris: Minuit.

Bourdieu, P. (1992): *An Invitation to Reflexive Sociology.* Chicago: Chicago University Press.

Boyd, R.–Richerson, P. J. (1985): *Culture and the Evolutionary Process*. Chicago: University of Chicago Press.

Boyd, R.–Richerson, P. J. (2000): Meme theory oversimplifies how culture changes. *Scientific American* 283, October, 58–59.

Boyer, P. (1994): *The Naturalness of Religious Ideas: A Cognitive Theory of Religion.* Berkeley: Unversity of California Press.

Brentano, F. (1874): *Psychologie vom empirischen Standpunkt.* Leipzig: Meiner.

Broadbent, D. (1958): *Perception and Commonication.* Oxford: Pergamon Press.

Brook, A. (1994). *Kant and the Mind*. Cambridge: Cambridge University Press.

Brooke-Rose, C. (1986): The dissolution of character in the novel. In: Heller, T. C.–Sosna, M.–Wellbery, D. E. (eds.): *Reconstructing Individualism: Autonomy, Individuality, and the Self in Western Thought.* Stanford, Ca.: Stanford University Press.

Brown, J. R. (1989): *The Rational and the Social.* London: Routledge.

Bruner, J. (1985): *Actual Minds and Possible Worlds.* Cambridge, Mass.: Harvard University Press.

Bruner, J. (1990): *Acts of Meaning.* Cambridge, Mass.: Harvard University Press.

Bruner, J. (1996): *The culture of education*. Cambridge, Mass.: Harvard University Press.

Bruner, J. (1997): Will cognitive revolutions ever stop? In: Johnson, D. M.–Erneling, C. E. (eds.): *The Future of the Cognitive Revolution.* New York: Oxford University Press, 279–292.

Bruner J.–Hastie, H. (1987, eds): *Making Sense: The child's Construction of the World.* London: Methuen.

Bruner, J.–Luciarello, J. (1989): Monologues as a narrative recreation of the world. In: Nelson, K. (ed.): Cambridge: Harvard University Press, 234-308.

Bruner, J. S.–Oliver, R. R.–Greenfield, P. M. (1966): *Studies in Cognitive Growth*. New York: Wiley.

Bühler, K. (1907): Eine Analyse komplizierter Denkvorgänge. In: F. Schumann (Hrsg.): *Bericht über den II. Kongress für exp. Psychologie.* Leipzig.

Bühler, K. (1908): Tatsachen und Probleme zu einer Psychologie der Denkvorgänge. I. Über Gedankenzusammenhänge. II. Über Gedankeneinnerungen. *Archiv für d. gesammte Psychologie* 12, 1–23, 24–92.

Bühler, K. (1913): *Die Gestaltwahrnehmungen*. Stuttgart: W. Spemann.

Bühler, K. (1922): *Die Geistige Entwicklung des Kindes.* Jena: Fischer. 3rd edition. Stuttgart: W. Spemann.

Bühler, K. (1927): *Die Krise der Psychologie*. Jena: Fischer.

Bühler, K. (1934): *Spractheorie*. Jena: Fischer. New English translation: Theory of Language: The Representational Function of Language. Translated by D. F. Goodwin. Amsterdam.

Bühler, K. (1936): *Die Zukunft der Psychologie und die Schule*. Wien–Leipzig: Fischer.

Bühler, K. (1960): *Das Gestaltprinzip im Leben des Menschen und bei der Tiere.* Bern: Huber.

Bühler, K. (1990). *Theory of Language. The Representational Function of Language.* Translated by Goodwin, Donald Fraser. Amsterdam–Philadelphia: John Benjamins.

Buss, D. M. (1994): *The Evolution of Desire*: *Strategies of Human Mating*. New York: Basic Books.

Buss, D. M. (1999): *Evolutionary Psychology. The New Science of the Mind*. Boston: Alyn Bacon.

Byrne, R.–Whiten, A. (1988, eds): *Machiavellian Intelligence*. Oxford: Clarendon Press.

Campbell, D. T. (1974): Evolutionary epistemology. In: Paul A. Schlipp (ed.): *The Philosophy of Karl Popper*. La Salle, Ill.: Open Court, 413–463.

Campbell, D. T. (1975): On the conflicts between biological and social evolution and between psychology and moral tradition. *American Psychologist* 30, 1103–1126.

Campbell, D. T. (1988): *Methodology and Epistemology for Social Science.* Chicago: University of Chicago Press.

Campbell-Kelly, M.–Aspray, W. (1996): *Computer: A History of the Information Machine.* New York: Basic Books.

Camus, A. (1954): *The Stranger.* Transl. by Stuart Gilbert. New York: Vintage Books.

Čapek, M. (1968): Ernst Mach's biological theory of knowledge. *Synthese* 18, 171–191.

Carrithers, M.–Collins, S.–Lukes, S. (1985, eds.): *The Category of the Person: Anthropology, Philosophy, History.* Cambridge, Mass.: Cambridge University Press.

Cassirer, E. (1951): *The Philosophy of the Enlightenment.* Princeton: Princeton University Press.

Changeux, J. P.–Dehaene, S. (1989): Neuronal models of cognitive functions. *Cognition* 33, 63–109.

Changeux, J. P. (1983): *L'homme neuronal.* Paris: Fayard.

Changeux, J. P.–Ricoeur, P. (2000): *What Makes us Think?* Princeton: Princeton University Press.

Chomsky, N. (1957): *Syntactic Structures.* The Hague: Mouton.

Chomsky, N. (1959): A review of Skinner's Verbal Behavior. *Language* 35, 26–58.

Chomsky, N. (1964): *Current Issues in Linguistic Theory.* The Hague: Mouton.

Chomsky, N. (1965): *Aspects of a Theory of Syntax.* Cambridge: MIT Press.

Chomsky, N. (1966): *Cartesian Linguistics.* New York: Harper.

Chomsky, N. (1968): *Language and Mind.* New York: Harcourt.

Chomsky, N. (1971): *Knowledge and Freedom.* New York: Pantheon Books.

Chomsky, N. (1975): *Reflections on Language.* New York: Pantheon Books.

Chomsky, N. (1980): *Rules and Representations.* New York: Columbia University Press.

Chomsky, N. (1986): *Knowledge of Language. Its Origins, Knowledge, and Use.* New York: Praeger.

Chomsky, N. (2000): *New Horizons in the Study of Language and Thought.* Cambridge: Cambridge University Press.

Churchland, P. (1981): Eliminative Materialism and Propositional Attitudes. *Journal of Philosophy* 78, 67–90.

Churchland, P. S. (1986): *Neurophilosophy.* Cambridge, Mass.: MIT Press.

Churchland, P. M. (1995): *The Engine of Reason, the Seat of the Soul: A Philosophical Journey into the Brain.* Cambridge, Mass.: MIT Press.

Clark, A. (1989): *Microcognition.* Cambridge, Mass.: Bradford Books/MIT Press.

Clark, A. (1994): *Associative Engines.* Cambridge, Mass.: MIT Press.

Clark, H. (1970): Word associations and linguistic theory. In: Lyons, J. (ed.): *New Horizons in Linguistics.* Harmondsworth: Penguin.

Colby, B. N. (1973): A partial grammar of Eskimo folktales. *American Anthropologist* 75, 645–662.

Cole, M. (1996): *Cultural psychology.* Cambridge: Harvard University Press.

Cole, M.–Scribner, S. (1978): Introduction to Vygotsky, (1978) 1–14.

Collins, A.–Quilian, M. (1968): How to make a language user? In: Tulving, E.–Donaldson, W. (eds.): *Organization of Memory.* New York: Academic Press.

Coser, L. A. (1992a): The Revival of the Sociology of Culture: The Case of Collective Memory. *Sociological Forum* 7, 365–373.

Coser, L. A. (1992b): Introduction: Maurice Halbwachs 1877–1945. In: *Halbwachs,* 1992, 1–34.

Cosmides, L.–Tooby, J. (1992): Psychological foundations of culture. In: Barkow, J.H.–Cosmides, L.–Tooby, J. (1992, eds): *The Adapted Mind.* New York: Oxford University Press.

Cosmides, L. et al. (1994): Beyond intuition and instinct blindness: Toward an evolutionarily rigorous cognitive science. *Cognition*, 50, 41–77.

Crary, J. (1990): *Techniques of the Observer: On Vision and Modernity in the Nineteenth Century.* Cambridge, Mass.: MIT Press.

Crawford, C.–Smith, M.–Krebs, D. (1987, eds): *Sociobiology and psychology: Ideas, issues, and applications.* Hillsdale, N.J.: Erlbaum.

Csányi, V. (1980): The general theory of evolution. *Acta Biol. Hung. Acad. Sci.* 31, 409–434.

Csányi, V. (1982): *General Theory of Evolution.* Budapest: Akadémiai Kiadó.

Csányi, V. (1989): *Evolutionary Systems and Society: A General Theory.* Durnham: Duke University Press.

Csányi, V. (1999): *Az emberi természet.* [Human Nature.] Budapest: Typotex.

Csibra, G.–Gergely, G. (1998): The teleological origins of mentalistic action explanations: A developmental hypothesis. *Developmental Science* 1, 255–259.

Csibra, G.–Gergely, G.–Biró, S.–Koós, O.–Brockbank, M. (1999): Goal-attribution without agency cues: The perception of 'pure reason' in infancy. *Cognition* 72, 237–267.

Cummins, D. D.–Allen, C. (1998, eds.): *The Evolution of Mind.* New York: Oxford University Press.

Cupchik, G.–László, J. (1992, eds.): *Emerging Visions of the Esthetic Process.* Cambridge, UK: Cambridge University Press.

Cziko, G. (1995): *Without Miracles: Universal Selection Theory and the Second Darwinian Revolution.* Cambridge, Mass.: MIT Press.

250

Damasio, A. (1994): *Descartes's Error.* New York: Basic Books.

Dawkins, D. (1976): *The Selfish Gene.* Oxford: Oxford University Press.

Dawkins, R. (1982): *The Extended Phenotype: The Gene as the Unit of Selection.* San Francisco: Freeman.

Dawkins, D. (1986): *The Blind Watchmaker.* London: Longman.

Dawkins, J. (1995): *River out of Eden.* New York: Basic Books.

Dehn, N.–Schank, R. (1982): Artificial and human intelligence. In: Sternberg, R. J. (ed.): *Handbook of Human Intelligence.* Cambridge, Mass.: Cambridge University Press, 352–391.

Dennett, D. (1971): Intentional systems. *The Journal of Philosophy* 68, 87–106.

Dennett, D. (1981): Intentional Systems. In: John Haugeland (ed.): *Mind Design: Philosophy, Psychology, Artificial Intelligence.* Montgomery, Vermont: Bradford Books, 220–242.

Dennett, D. (1985): Can machines think? In: M. Shafto (ed.): *How we Know?* New York: Harper and Row.

Dennett, D. (1987): *The Intentional Stance.* Cambridge, Mass.: Bradford Books/ MIT Press.

Dennett, D. (1990): The interpretation of texts, people and other artifacts. *Philosophy and Phenomenological Research* 1, Supplement, 177–194.

Dennett, D. (1991a): *Consciousness Explained.* Boston: Little Brown.

Dennett, D. (1991b): Real patterns. *Journal of Philosophy* 89, 27–51.

Dennett, D. (1995): *Darwin's Dangereous Idea.* New York: Simon and Schuster.

Dennett, D. (1996): *Kinds of Minds.* New York: Basic Books.

Dennett, D.–Kinsbourne, M. (1992): Time and the observer. The where and when of consciousness in the brain. *Behavioral and Brain Sciences* 15, 183–247.

Dennett, D. (1998): Memes: Myths, Misunderstandings and Misgivings. Manuscript.

Deri, Susan (1990): Great representatives of Hungarian psychiatry: Bálint, Ferenczi, Hermann, and Szondi. *Psychoanalytic Review* 77, 491–501.

Descartes, R. (1637/1911): *Discourse on Method.* Transl. Elisabeth Haldane. London: Routledge.

Descartes, R. (1649/1989): *The Passions of the Soul.* Transl. Stephen Voss. Indianapolis: Hackett.

Dessoir, M. (1911): *Abriss einer Geschichte der psychologie.* Heidelberg: Carl Winter.

Dewey, J. (1910): *The Influence of Darwin on Philosophy.* New York: Henry Holt.

Dewsbury, D. A. (1994): Paul Harkai Schiller. *Psychological Record* 44, 307–350.

Dewsbury, D. A. (1996): Paul Harkai Schiller: The Influence of his Brief Carreer. In: Kimble, G. A.–Boneau, C. A.–Wertheimer, M. (eds;): *Portraits of Pioneers in Psychology.* Mahwah, NJ: Lawrence Erlbaum, 281–293.

Diamond, S. (1974, ed.): *The Roots of Psychology.* New York: Basic Books.

Dienes, V.: http://www.terrasoft.hu/kultura/dienes/indexde.htm

Dienes V. (1914): *A mai lélektan főbb irányai.* [Main trends of contemporary psychology.] Budapest: Haladás.

Dienes V. (1923): Bergson lélektana. [The psychology of Bergson.] In: Bergson, H.: *Idő és szabadság.* Budapest: Franklin Társulat, 7–49 [In Hungarian].

Dienes, V. (1983): Visszaemlékezés. [Remembrance.] In: *Hajnalvárás.* Budapest: Szent István Társulat, 16–51.

Dienes, Z. and Perner, J. (1999): A Theory of Implicit and Explicit Knowledge. *Behavior and Brain Sciences* 22, 735–755.

Dilthey, W. (1894): Ideen über eine beschreibende und zergliedernde Psychologie. *Sitzungberichte der Akademie der Wissenschaften zu Berlin*, 2, 1309–1407.

Donald, M. (1991): *Origins of the Modern Mind: Three Stages in the Evolution of Culture and Cognition.* Cambridge, Mass.: Harvard University Press.

Donald, M. (1993): Précis of Origins of the Modern Mind: Three Stages in the Evolution of Culture and Cognition. *Behavioral and Brain Sciences* 16, 737–791.

Donald, M. (1997): The mind considered from a historical perspective. In: Johnson, D. M.–Erneling, C. E. (eds.): *The future of the cognitive Revolution.* New York: Oxford University Press, 355–365.

Donald, M. (2001): *A Mind So Rare. The Evolution of Human Consciousness.* New York–London: W. W. Norton and Company.

Dreyfus, H. (1972/1979): *What Computers Can't Do: A Critique of Artificial Intelligence.* (2nd ed.) San Fracisco: Freeman.

Duchaine, B.–Cosmides, L.–Tooby, J. (2001): Evolutionary Psychology and the Brain. *Current Opinions in Neurobiology* 11, 225–230.

Dunbar R. (1996): *Grooming, Gossip, and the Evolution of Language.* Cambridge, MA.: Harvard UP.

Dunbar, R. (2003): Are there cognitive constraints on an E-World? In: Nyíri, K. (ed.): *Mobile communication. Essays on cognition and community*. Wien: Passsagen Verlag, 57–69.

Durkheim, E. (1895/1982): *The Rules of Sociological Method.* New York: Free Press.

Durkheim, É.–Mauss, M. (1903): De quelques formes primitives de classification. *Année Scoiologique* 6.

Duvignaud, J. (1968): Préface and Introduction. In: *Halbwachs*, 1968, I–XV, XVII–XXII.

E. Bártfai, L. (1987): Sokan vagyunk kevesen: Egy gazdálkodó író: ifj. Leopold Lajos. [On a landed writer, Lajos Leopold, Jr.] *Dunatáj* 10, 5–16.

Eccles, J. C. (1977): Part II in *Popper and Eccles,* 1977.

Edelman, G. M. (1987): *Neural Darwinism: The Theory of Neural Group Selection.* New York: Basic Books.

Edelman, G. M. (1989): *The Remembered Present.* New York: Basic Books.

Ellul, J. (1954): *La technique.* Paris: Armand Colin.

Ellul, J. (1967): *The Technological Society*. New York: Knopf.

Elman, J. L.–Bates, E. A.–Johnson, M.H.–Karmiloff-Smith, A.–Parisi, D.–Plunkett, K. (1996): *Rethinking Innateness: A Connectionist Perspective on Development.* Cambridge, Mass.: MIT Press.

Erős, F. (1995): Mérei Ferenc életműve és a magyar szociálpszichológia. [The oeuvre of Ferenc Mérei and Hungarian social psychology.] In: Kiss, 1995a, 123–136.

Erős, F. (1979): Szociálpszichológia és kritikai elmélete. [Social psychology and its critical theory.] *Pszichológiai Tanulmányok* XV, 347–374.

Eschbach, A. (1984, ed.): *Bühler Studien 1–2.* Frankfurt: Suhrkamp.

Eschbach, A. (1988, ed.): *Karl Bühler's theory of language.* Amsterdam: Benjamins.

Fagot, C. (1995): Repetition blindness: Perception or memory failure? *Journal of Experimental Psychology: Human Perception & Performance* 21, 275–292.

Feldman, J. A.–Ballard, J. (1982): Connectionist models and their properties. *Cognitive Science* 6, 205–254.

Fodor, J. (1968): *Psychological Explanation.* New York: Random House.

Fodor, J. (1975): *The Language of Thought.* Cambridge, Mass.: Harvard University Press.

Fodor, J. (1980): Methodological solipsism considered as a research strategy in cognitive psychology. *The Behavioral and Brain Sciences* 3, 63–73.

Fodor, J. (1983): *The Modularity of Mind.* Cambridge, Mass.: MIT Press.

Fodor, J. (1985): Fodor's guide to mental representation: The intelligent auntie's vademecum. *Mind* 94, 76–100.

Fodor, J. (1990): *A Theory of Content and Other Essays.* Cambridge, Mass.: MIT Press.

Fodor, J. (1998): *In Critical Condition.* Cambridge, Mass.: MIT Press.

Fodor, J. (2000): *The Mind Doesn't Work That Way*. Cambridge, Mass.: MIT Press.

Fodor, J.–Pylyshyn, Z. W. (1988): Connectionism and cognitive architecture. *Cognition* 28, 3–71.

Fodor, K.–Kós, B. (1995): Lechner Károly, a "psychophisiológia" kolozsvári művelője. [Károly Lechner the praciticioner of "psyhophysiology" at Kolozsvár.] In: Kiss, 1995a, 20–30.

Forster, K. I. (1979): Levels of processing and the structure of the language processor. In: Cooper, W. E.–Walker, E. C. T. (eds.): *Sentence Processing*. Hillsdale: Erlbaum.

Frege, G. (1879): *Begriffsschrift, eine der arithmetischen nachgebildete Formelsprache des reinen Denkens.* Halle.

Frege, G. (1884/1950): *The Foundations of Arithmetic.* Transl. J. L. Austin. New York: Philosophical Library.

Frege, G. (1892/1984): *Collected Papers on Mathematics, Logic and Philosophy.* Oxford: Oxford University Press.

Frege, G. (1966): *Funktion, Begriff, Bedeutung. 2., Durchgesehene Aufl.* Gottingen: Vandenhoeck u. Ruprecht.

Friedman, G. (1968): *Halbwachs, Maurice. International Encyclopedia of the Social Sciences..* London: MacMillan, 304–306.

Galagher, S. (2000): Philosophical conceptions of the self: Implications for cognitive science. *Trends in Cognitive Sciences* 4, 14–21.

Garai, L. (1969): *Személyiségdinamika és társadalmi lét.* [Personality dynamics and social being.] Budapest: Akadémiai Kiadó.

Garai, L. (1993): The brain and the mechanism of psychosocial phenomena. *Journal of Russian and East European Psychology,* 6, 143–164.

Gardner. H. (1985): *The Mind's New Science: A History of the Cognitive Revolution.* New York: Basic Books.

Garrett, D. (1981): Hume's self-doubts about personal identity. *The Philosophical Review*, 40, 337-358.

Garrett, M. F. (1981): Levels of processing in sentence production. *In: Studies Presented to Manfred Bierwisch.* Dordrecht: Reidel.

Gaulin, J.–McBurney, F. (2001): *Psychology. An Evolutionary Approach.* New York: Prentice-Hall.

Geach, P.–Black, M. (1980, ed.): *Translations from the Philosophical Writings of Gottlob Frege.* Oxford: Blackwell.

Gergely, G. (1994): From self-recognition to theory of mind. In: S. Parker–R. Mitchell–M. Boccia (eds): *Self-Awareness in Animals and Humans: Developmental Perspectives.* Cambridge: Cambridge University Press, 51–61.

Gergely, G. (2003): The development of understanding self and agency. In: U. Goshwami (ed.): *Handbook of Childhood Cognitive Development.* Oxford: Blackwell.

Gergely, G.–Csibra, G. (1997): Teleological reasoning in infancy: The infant's naive theory of rational action. A reply to Premack and Premack. *Cognition,* 63, 227–233.

Gergely, G.–Beckering, H.–Király, I. (2002): Rational imitation of goal-directed actions in preverbal infants. *Nature* 415, 755.

Gide, A. (1914/1953): *Lafcadio's Adventures.* Transl. Dorothy Bussy. New York: Vintage Books.

Glass, J. M. (1993): *Shattered Selves: Multiple Personality in a Postmodern World.* Ithaca. NY: Cornell University Press.

Goldstein, J. (1994): The advent of psychological modernism in France: An alternative narrative. In: Ross, D. (ed.): *Modernist Impulses in the Human Sciences. 1870–1930.* Baltimore: Johns Hopkins University Press, 190–209.

Gombrich, E. H. (1960): *Art and Illusion.* London: Phaido.

Gould, S. J.–Lewontin, R. C. (1979): The Sprandels of San Marco and the Panglossian paradigm: A critique of the adaptationist program. *Proceedings of the Royal Society* B205, 581–598.

Gould, S. J.–Vrba, E. S. (1982): Exaptation – a missing term in the science of form. *Paleobiology* 8, 4–15.

Graesser, A. C. (1992): *Questions and Information Systems.* Hillsdale, NJ: Erlbaum.

Graesser, A. C. (1996): *Models of Understanding Text.* Mahwah, NJ: Lawrence Erlbaum Associates.

Graesser, A. C.–Clark, L. F. (1986): *Structure and Pocedures of Implicit Knowledge.* Norwood, NJ: Ablex.

Grastyán, E. (1961): The significance of the earliest manifestations of conditioning in the mechanism of learning. In: Delafresnaye, J. F. (ed.): *Brain Mechanisms and Learning.* Oxford: Blackwell, 243–263.

Grastyán, E. (1967): A tanulás alapvető paradoxonai és idegélettani feloldásuk. [Basic paradoxes of learning and their resolution by neurophysiology.] *Pedagógiai Szemle,* 10, 893–914.

Grastyán, E. (1985): *A játék neurobiológiája.* [The neurobiology of play.] Budapest: Akadémiai Kiadó.

Greene, R. L. (1991): The Ranschburg effect: The role of guessing strategies. *Memory & Cognition* 19, 313–317.

Gregory, R. L. (1981): *Mind in Science.* Cambridge: Cambridge University Press.

Greimas, A. J. (1966): *Sémantique structurale.* Paris: Larousse.

Grice. P. (1975): Logic and conversation. In: Cole, P.–Morgan, J. L. (eds): *Syntax and Semantics.* Vol. 3. Speech Acts. New York: Academic Press.

Győri, M. (2006): *Autism and Cognitive Architecture.* Budapest: Akadémiai Kiadó.

Hacker, P. M. S. (1995): Helmholtz's theory of perception: An Investigation into its Conceptual Framework. *International Studies in the Philosophy of Science* 9, 199–214.

Halász, László (2000): *Az értelmezés változatai.* Debrecen: Csokonai.

Halász, L.–László, J.–Pléh, Cs. (1988): Cross-cultural studies in reading short stories, *Poetics* 17, 287–303.

Halbwachs, M. (1912): *La classe ouvrière et les niveaux de vie.* Paris: Felix Alcan.

Halbwachs, M. (1918): La doctrine d'Émile Durkheim. *Revue Philosophique de la France et de l'Étranger* 85, 353–411.

Halbwachs, M. (1925): *Les cadres sociaux de la mémoire.* Paris: Alcan.

Halbwachs, M. (1941): *La topographie légendaire des Évangiles en Terre Sainte: étude de mémoire collective.* Paris: Presses Universitaires de France.

Halbwachs, M. (1950): *La mémoire collective.* Paris: Presses Universitaires de France.

Halbwachs, M. (1968): *La mémoire collective.* Paris: Presses Universitaires de France (2nd edition).

Halbwachs, M. (1978): *The Causes of Suicide.* New York: Free Press.

Halbwachs, M. (1980): *Collective Memory.* New York: Harper.

Halbwachs, M. (1992): *On Collective Memory.* Chicago, IL: University of Chicago Press.

Halbwachs, M. (1994): *Les cadres sociaux de la mémoire.* Paris: Albin Michel. New edition of Halbwachs, 1925.

Harkai Schiller, P. (1930): *A lélektani kategóriák rendszerének kialakulása.* [The formation of psychological categories.] Budapest: Pázmány Péter Tudományegyetem Philosophiai Szemináriuma.

Harkai Schiller, P. (1940): *A lélektan feladata.* [The task of psychology.] Budapest: MTA (New edition: Budapest, Osiris, 2002).

Harkai Schiller, P. (1944): *Bevezetés a pszichológiába: A cselekvés elemzése.* [An introduction to psychology: The analysis of action.] Budapest: Pathéon.

Harkai Schiller, P. (1946): *Lélektani tanulmányok Ranschburg Pál emlékére.* [Psychological studies in memory of Pál Ranschburg.] Budapest: Pázmány Péter Tudományegyetem Lélektani Intézete.

Harmat, P. (1990): Die Psychoanalyse und die ungarische Gesellschaft. In: Schorr, A.–Whener, E. G. (eds): *Psychologiegeschichte heute.* Götingen: Hogreffe, 275–284.

Harmat, P. (1986): Leben und Werk von Imre Hermann. *Psyche: Zeitschrift für Psychoanalyse und ihre Anwendungen* 40, 640–651.

Harmat, P. (1987): Psychoanalysis in Hungary since 1933. *International Review of Psycho-Analysis* 14, 503–508.

Harmat, P. (1994): *Freud, Ferenczi és a magyarországi pszichoanalízis.* [Freud, Ferenczi, and psychoanalysis in Hungary.] Budapest: Bethlen Gábor Könyvkiadó.

Harmat, P. (1995): A budapesti pszichoanalitikus iskola. [The psychoanalytic school of Budapest.] In: Kiss, 1995a, 98–113.

Harnad, S. (1990): The Symbol Grounding Problem. *Physica* D 42: 335–346.

Harnad, S. (1996): The Origin of Words: A Psychophysical Hypothesis. Manuscript.

Harré, R. (1986): Social sources of mental content and order. In: Margolis, J.–Manicas, P. T.–Harré, R.–Secord, P. F.: *Psychology: Designing the Discipline.* London: Blackwell, 91–127.

Harré, R. (1989): Vygotsky and artificial intelligence: What could cognitive psychology possibly be about? *Philosophical Psychology* 2, 389–400.

Hassan, I. H. (1987): *The Postmodern Turn.* Columbus, Ohio: Ohio State University.

Hassan, I. H. (1990): *Selves at Risk.* Madison, Wisconsin : University of Wisconsin Press.

Hatfield, G. (1990): *The Natural and the Normative: Theories of Spatial Perception from Kant to Helmholtz.* Cambridge, Mass.: MIT Press.

Hatfield, G. (1993): Helmholtz and classicism: The science of asthetics and the aesthetics of science. In: Cahan, 1993, ed., 522–558.

Haugeland, J. (1981): The nature and plausibility of cognitivism. *Behavior and Brain Sciences* 2, 215–226.

Hayek, F. A. (1967): *Studies in Philosophy, Politics, and Economy.* Oxford: Oxford University Press.

Hebb, D. O. (1949): *The Organization of Behavior.* New York: Wiley.

Heller, A. (1979): *A Theory of Feelings.* Assen: Van Gorcum.

Helmholtz, H. (1880): *Popular Scientific Lectures.* New York: Liveright.

Helmholtz, H. von (1866/1896/1924): *Helmholtz's Treatise on Physiological Optics.* Rochester, NY: The Optical Society of America (The English version is a translation of the Third edition).

Helmholtz, H. von. (1875): *On the Sensations of Tone as a Physiological Basis for the Theory of Music.* London: Longmans. Small excerpt in Diamond, 1974, 152–154.

Helmholtz, H. von (1878): The facts in perception. In: Helmholtz, 1922/1977, 116–185.

Helmholtz, H. von (1921/1977): *Epistemological Writings.* Dordrecht: D. Reidel.

Helmholtz, H. von (1995): *Science and Culture.* Chicago: University of Chicago Press.

Hermann, I. (1984): *Az ember ősi ösztönei.* [The ancient instincts of man.] Budapest: Magvető.

Hermann, I. (1929): *Die Psychoanalyse als Methode.* Wien: Liveright.

Hermann, I. (1926): *Gustav Theodor Fechner.* Wien: Internationaler Psychoanalitischer Verlag.

Hermann, I. (1980): *Parallèlismes: Bólyai, Fechner, Darwin, Brouwer, Hilbert, Cantor, Russell.* Paris: Denoël.

Hernadi, P. (1995): *Cultural Transactions: Nature, Self, Society.* Ithaca, NY: Cornell University Press.

Hilgard, E. (1980): The trilogy of mind: Cognition, affection, and conation. *Journal of the History of the Behavioral Sciences* 16, 107–117.

Hintikka, J. (1975): Concepts as vision: On the problem of representation in modern art and in modern philosophy. In: Hintikka, J.: *The Intentions of Intensionality and Other New Models for Modalities.* Dordrecht: Reidel, 223–251.

Hirschfeld, L. A.–Gelman, S. A. (1994, eds): *Mapping the mind: Domain specificity in cognition and culture.* Cambridge: Cambridge University Press.

Hirst, W.–Maner, D. (1995): Opening vistas for cognitive psychology. In: Martin, L. M. W.– Nelson, K.–Tobach, E. (eds): *Sociocultural Psychology* 89–124.

Hochberg, J. E. (1962): Nativism and epiricism in perception. In: Postman, 1962, ed. 255–330.

Hochberg, J. E. (1978): *Perception.* (2nd edition) Englewood Cliffs, NJ.

Hoffman, R. R.–Cochran, E. L.–Mead, J. M. (1990): Cognitive metaphors in experimental psychology. In: Leary, D. E. (ed.): *Metaphors in the History of Psychology*. Cambridge: Cambridge University Press, 173–229.

Hofstadter, D. (1987): Cognition, subcognition. Sortir du rêve de Boole. *Le Débat* 47, 26–44.

Holenstein, E. (1973): Jakobson und Husserl: Ein Beitrag zur Genealogie des Strukturalismus. In: Parret, H. (ed.): *History of Linguistics and Contemporary Linguistics*. Berlin: Mouton, 772–810.

Horváth, J. (1922): *Magyar irodalomismeret.* Budapest: Minerva.

Hull, D. L.–Langman, R. E.–Glenn, S. S. (2001): A general account of selection: Biology, immunology and behavior. *Behavioral and Brain Sciences* 24, 511–628.

Hull, D. L. (1943): *Principles of Behavior.* New York: Appleton.

Hull, D. L. (1982): The naked meme. In: Plotkin, H. C. (ed.): *Learning, Development, and Culture*. Chichester: Wiley, 273–323.

Humboldt, W. von (1827): *Ideen zu einem Versuch die Grenzen der Wirksamkeit des Staats zu bestimmen.* Berlin: Deuticke.

Hume, D. (1739/1888): *A Treatise of Human Nature.* Oxford: Clarendon, New York: Random House, 3–71.

Humphrey, N. (1999): Cave art, autism, and the evolution of the human mind. *Journal of Consciousness Studies* 6 (No. 6/7).

Humphrey, N. K. (1976): The social function of intellect. In: P. P. G. Bateson–R. A. Hinde (eds.): *Growing Points in Ethology*. Cambridge: Cambridge University Press, 303–317.

Humphrey, N. K. (1980): Nature's psychologists. In: B. Josephson–W. Ramachandran (eds.): *Consciousness and the Physical World*. Oxford: Pergamon Press, 57–80.

Husserl, E. (1900–1901): *Logische Untersuchungen* 1–2. Halle: Fisher.

Hutton, P. H. (1993): *History as an Art of Memory.* Hannover: University Press of New England.

Jackendoff, R. (1999): Possible stages in the evolution of the language capacity. *Trends in Cognitive Sciences* 3, 272–279.

Jacob, F. (1977): Evolution and tinkering. *Science* 196, 1161–1166.

James, W. (1890): *The Principles of Psychology.* New York: Holt.

James, W. (1909): *A Pluralistic Universe.* New York: Longmans.

Janet, P. (1928): *L'évolution de la mémoire et de la notion du temps.* Paris: Alcan.

Janik, A.–Toulmin, S. (1973): *Wittgenstein's Vienna.* New York: Simon and Schuster.

Janos, A. C. (1982): *The Politics of Backwardness in Hungary: 1825–1945.* Princeton: Princeton University Press.

Jaroshevsky, M. G.–Gurgenidze, G. S. (1982): *Afterword for Vygotsky,* 437–458.

Jennings, H. S. (1906): *Behavior of the Lower Organisms.* New York: Columbia University Press.

Jennings, H. S. (1909/1962): *Behavior of the Lower Organisms.* Bloomington, Indiana University Press.

Jerne, N. K. (1955): The natural selection theory of antibody formation. *Proceedings of the National Academy of Sciences* 41, 849–857.

Jerne, N. K. (1985): The generative grammar of the immune system. *Science* 229, 1957–1959.

Johnson, D. N.–Erneling, C. E. (1997, eds): *The future of the cognitive revolution.* New York: Oxford University Press. 335–352.

John-Steiner, V. (1985): *Notebooks of the Mind. Explorations of Thinking.* Albuquerque: University of New Mexico Press.

Joravsky, D. (1989): *Russian Psychology: A Critical History.* Oxford: Blackwell.

Julesz, B. (1991): Early vision and focal attention. *Reviews of Modern Physics* 63, 735–752.

Julesz, B. (1996): *Dialogues on Perception.* Cambridge, Ma.: MIT Press.

Kallfelz, F. (1929): *Das Ökonomieprinzip bei Ernst Mach.* München: Lindl.

Kamp, R. (1984): Axiomatische Leitfäden statt dogmatischer Gängelbänder. Karl Bühlers Beitrag zur Wissenschaftstheorie der Einzelwissenschaften. In: Eschbach, 1984, Vol. 1, 40–97.

Kampis, G. (2001): Matter Matters. Lecture at the "Holism and Reductionism" Conference, Eötvös L. Univ., Budapest, May 21, 2001.

Kant, I. (1787/1965): *The Critique of Pure Reason.* Transl. J. M. D. Meiklejohn. New York: St. Martin.

Karácsony, S. (1985): *A magyar észjárás.* [The Hungarian way of thinking.] Budapest: Magvető.

Kardos, L. (1934): *Ding und Schatten.* Leipzig: Denticke.

Kardos, L. (1960): *Die Grundfragen der Psychologie und die Forshungen Pawlow's.* Budapest: Akadémiai Kiadó.

Kardos, L. (1980): *The Origins of Neuropsychological Information.* Budapest: Akadémiai Kiadó.

Kardos, L. (1984): Errinerungen an Karl Bühler. In: Eschbach, A. (ed.): *Bühler Studien* Vol. 1. Frankfurt: Suhrkampf.

Kardos, L. (1988): *Az állati emlékezet.* [Animal memory.] Budapest. Akadémiai Kiadó.

Karmiloff-Smith, A. (1992): *Beyond Modularity. A Developmental Perspective on Cognitive Science.* Cambridge, Mass.: MIT Press.

Karmiloff-Smith, A. (1998): Development itself is a key to understanding developmental disorders. *Trends in Cognitive Sciences* 2, 389–398.

Karvalics, L. Z. (2002): The Security Aspect of Information Society as a Global Biocultural System. In: Brunsetein, K.–Berlauer, J. (eds) *Human Choice and Computers*. Boston: Kluwer, 147–162.

Kende, Zs. (1974): *A Galilei Kör megalakulása.* [The foundation of the Galilei Circle.] Budapest: Akadémiai Kiadó.

Ketellar, T.–Ellis, B. J. (2000): Are Evolutionary Explanations Unfalsifiable? *Psychological Inquiry,* 11, 1–21.

Kiesow, K. F. (1988): Aussageinhalt bei Gomperz, Bühler und Popper. In: *Bühler Studien.* Vol. I., 246–264.

Kintsch, W. (1974): *The Representation of Meaning in Memory.* Hillsdale: Erlbaum.

Kintsch, W.–Van Dijk, T. (1978): Toward a model of text comprehension and production. *Psychological Review* 85, 363–394.

Kirkeboen, G. (1997): Descartes's (1628) *Regulae* and cognitive science. Talk at the 29th CHEIRON meeting, University of Richmond, June 19–22.

Kiss, Gy. (1987): The first steps of experimental psychology in Hungary. *Revisita de Historia de la Psicologia* 8, 315–318.

Kiss, Gy. (1995a, ed.): *Pszichológia Magyarországon.* [Psychology in Hungary.] Budapest: Országos Pedagógiai Könyvtár és Múzeum.

Kiss, Gy. (1995b): *A hazai pszichológiatörténeti kutatások eredményei.* [Results in the historiography of Hungarian psychology.] In: Kiss, 1995a, 8–19.

Klagge, J. C. (1989): Wittgenstein and neuroscience. *Synthese* 78, 319–343.

Koch, S.–Leary. D. E. (1985, eds): *A Century of Psychology as Science.* New York.: McGraw-Hill.

Koffka, K. (1924): *The Growth of the Mind.* New York: Harcourt

Köhler, W. (1917): *Intelligenzprüfungen an Anthropoiden.* Berlin: Prussian Academy of Sciences.

Köhler, W. (1947): *Gestalt Psychology.* New York: Liveright.

Kolakowski, L. (1968): *Positivist Philosophy: From Hume to the Vienna Circle.* New York: Doubleday.

Kornis, Gyula (1917): *A lelki élet I–III.* [Mental life.] Budapest: MTA.

Kosslyn, S. M. (1980): *Image and the mind.* Cambridge, Mass.: Harvard University Press.

Kosslyn, S. M. (1994): *The resolution of the imagery debate.* Cambridge, Mass.: Harvard University Press.

Kostyleff, N. (1911): *La crise de la psychologie expérimentale.* Paris: Alcan.

Kovács, I. (2000): Human development of perceptual organization. *Vision Res. Special Issue on Attention* 40 (10–12), 1301–1310.

Kovács, I.–Julesz, B. (1993): A closed curve is much more than an incomplete one: Effect of closure in figure-ground segmentation, *Proceedings of the National Academy of Sciences of the United States of America,* Vol. 90, No.16 (August 15, 1993), 7495–7497.

Kovács, I.–Papathomas, T. V.–Yang, M.–Fehér, A. (1996): When the brain changes its mind: interocular grouping during binocular rivalry. *Proceedings of the National Academy of Sciences of the United States of America,* Vol 93 (26): 15508–11.

Kovács, M. M. (1994): *Liberal Professions and Illiberal Politics: Hungary from the Habsburgs to the Holocaust.* New York: Oxford University Press.

Kozáry, Gy. (1898): *Wundt rendszerének ismertetése és kritikája.* [Presentation and critical analysis of the system of Wundt.] Budapest: Atheneum.

Krajcsi, A.–Kovács, A.–Pléh, Cs. (2001): Internethasználók kommunikatív szokásai. In: Kristóf Nyíri (ed.): *A 21. századi kommunikáció új útjai: Tanulmányok.* [New Perspectives on 21st century Communications: Studies.], Wien: Passagen Verlag.

Krech, D.–Rosenzweig, M. R.–Bennett, E. L. (1960): Effects of environmental complexity and training on brain chemistry. *Journal of Comparative and Physiological Psychology* 53, 509–519.

Kripke, S. (1982): *Wittgenstein on Rules and Private Language.* Oxford: Basil Blackwell.

Kuhn, T. (1970): *The Structure of Scientific Revolutions.* (2nd, enl. ed.) Chicago: University of Chicago Press.

Külpe, O. (1912): Über die moderne Psychologie des Denkens. *Monatschrift für Wissenschaft, Kunst und Technik* 14, 1070–1100.

Külpe, O. (1922): *Vorlesungen über Psychologie.* Leipzig: Barth.

Kundera, M. (1986): *The Art of the Novel.* New York: Grove Press.

Kusch, M. (1995): *Psychologism: A Case Study in the Sociology of Philosophical Knowledge.* London: Routledge.

La Mettrie, J. O. (1994): *Man a Machine, and Man a Plant.* Indianapolis: Hackett.

Labov, W.–Waletzky, J. (1967): Narrative analysis: Oral versions of personal experience. In: Heim, J. (ed.): *Essays on the Verbal and Visual Arts.* Seattle: American Ethnological Society, 12–44.

Lachter, J.–Bever, T. G. (1988): The relation between linguistic structure and associative theories of language learning: A constructive critique of some connectionist learning models. *Cognition* 28, 195–247.

Lacombe, R. (1930): *La psychologie bergsonienne. Étude critique.* Paris: Alcan.

Laland, K. N.–Odling-Smee, F. J.–Feldman, M. V. (2000): Niche construction, biological evolution and cultural change. *Behavior and Brain Sciences,* 131–175.

Lamiell, J. T. (2002): William Stern: More than "The IQ guy". In: Kimble, G. A.–Boneau, C. A.–Wertheimer, M. (eds): *Portraits of Pioneers in Psychology.* Vol. 2. Washington: APA and Lawrence Erlbaum, 77–85.

Lamiell, J. T. (2003): *Beyond Individual and Group Differences: Human Individuality, Scientific Psychology, and William Stern's Critical Personalism.* Thousand Oaks, CA: Sage Publications, Inc.

Lamiell, J. T.–Deutsch, W. (2000, eds): Psychology and critical personalism. *A Special Issue of the Journal Theory and Psychology* Vol. 10, No. 6.

Lana, R. E. (1976): *The Foundations of Psychological Theory.* Hillsdale, NJ: Lawrence Erlbaum.

Lange, F. A. (1880–81): *History of Materialism I–III.* London: Trübner.

Lanteri-Laura, G. (1970): *Histoire de la phrénologie.* Paris: Presses Universitaires de France.

Lashley, K. (1951): The problem of serial order in behavior. In: Jeffers, L. A. (ed.): *Cerebral Mechanisms in Behavior.* New York, Wiley, 112–136.

László, J. (1986): Scripts for interpersonal situations. *Studia Psychologica* 28, 125–135.

László, J. (1999): *Társas tudás, elbeszélés, identitás.* [Social knowledge, narration, identity.] Budapest: Scientia Humana-Kairosz.

László, J.–Pléh, Cs. (1992): Hungary. In: Sexton, V. S. (ed.): *International Psychology.* Lincoln: University of Nebraska Press, 196–205.

Latour, B. (1987): *Science in the Making.* Cambridge, Mass.: Harvard University Press.

Latour, B. (1993): *We Have Never Been Modern.* New York: Harvester.

Latour, B.–Woolgar, S. (1986): *Laboratory Life: The Construction of Scientific Facts.* 2nd edition. Princeton, NJ: Princeton University Press.

Laudan, L. (1977): *Progress and its Problems.* Berkeley: University of California Press.

Leahey, T. H. (1980): *A History of Psychology.* Englewood Cliffs: Prentice Hall.

Leiber, J. (1991): *An Invitation to Cognitive Science.* Cambridge: Basil Blackwell.

Lenin, V. I. (1927): *Materialism and Empiriocriticism.* Collected Works Vol. XIII. New York: International Publishers.

Leontev, A. A. (1978): *Activity, Consciousness, and Personality.* Englewood Cliffs, NJ: Prentice Hall.

Leopold, L. (1912): *A presztízs.* Budapest: Franklin.

Leopold, L. (1913): *The Prestige: A Psychological Study of Social Estimates.* London: Routledge.

Leslie, A. (1987): Pretense and representation: The origins of the "theory of mind". *Psychological Review* 94, 412–426.

Lévi-Strauss, C. (1962): *La pensée sauvage.* Paris: Plon.

Lévi-Strauss, C. (1973): *Anthropologie structurale.* Paris: Plon.

Lévy, P. (1990): *Les technologies de l'intelligence.* Paris: Découverte.

Lévy, P. (1994): *L'intelligence collective. Pour une anthropologie du cyberspace.* Paris: Découverte.

Lewontin, R. C. (1970): The units of selection. *Annual Review of Ecology and Systematics* 1, 1–18.

Lifton, R. J. (1993): *The Protean Self: Human Resilience in an Age of Fragmentation.* New York: Basic Books.

Lodge, D. (1988): *Nice Work.* London: Secker and Warburg.

Loeb, J. (1900): *Comparative Physiology of the Brain and Comparative Psychology.* New York: Putnam.

Loeb, J. (1912): *The Mechanistic Conception of Life.* Chicago, Ill.: University of Chicago.

Lorenz, K. (1941): Kant's Lehre vom apriorischen in Lichte gegenwartiger Biologie. *Blatter für Deutsche Philosophie* 15, 94–125.

Lorenz, K. (1965): *Evolution and Modification of Behavior.* Chicago: University of Chicago Press.

Luciarello, J. (1995): Mind, culture, person: Elements in a cultural psychology. *Human Development* 38, 2–18.

Lukács, G. (1963): *Die Eigenart des Aestetischen.* Frankfurt: Suhrkamp.

Luria, A. R.–Vygotsky, L. S. (1992): *Ape, Primitive Man, and the Child: Essays in the History of Behavior.* New York: Harvester.

Lycan, T. G. (1990, ed.): *Mind and Cognition. A Reader.* Cambridge, Mass.: Blackwell.

Mach, E. (1897): *Contributions to the Analysis of Sensations.* Transl. C. M. Williams. Chicago, Ill.: Open Court.

Mach, E. (1905/1926): *Knowledge and Error. Sketches on the Psychology of Enquiry.* Dordrecht: D. Reidel, 1976. Original: Erkenntniss und Irrtum. Leipzig: Bart, 1905. 5th edition: 1926.

Mach, E. (1910): *Popular Scientific Lectures.* 4th edition. Transl. Thomas J. McCormack Chicago, Ill.: Open Court.

Mach, E. (1976): *Knowledge and Error. Sketches on the Psychology of Enquiry.* Transl. Thomas J. McCormack and Paul Folkes. Dordrecht: D. Reidel.

Mannheim, K. (1936): *Ideology and Utopia.* New York: Harcourt.

Mannheim, K. (1952): *Essays on the Sociology of Knowledge.* New York: Oxford University Press.

Márkus, Gy. (1968a): *Marxizmus és antropológia.* [Marxism and anthropology.] Budapest: Akadémiai Kiadó.

Márkus, Gy. (1968b): Az észlelés és a pszichofizikai probléma. [Perception and the psychophysical problem.] *Magyar Filozófiai Szemle* 12, 217–299.

Marslen-Wilson, W.–Tyler, L. K. (1980): The temporal structure of spoken language understanding. *Cognition* 8, 1–17.

Martindale, C. (1990): *The Clockwork Muse.* New York: Basic Books.

Marton, L. M. (1964): Az aktivációs és a tájékozódási reakció főbb működési elvei és jelentőségük a pszichikus folyamatok megismerésében. [Basic principles of activation and orientation reactions and their role in the understanding of psychological processes.] *Pszichológiai Tanulmányok* VI, 37–50.

Marton, L. M. (1970): Tanulás, vizuális-poszturális testmodell és a tudat kialakulása. [Learning a visu-postural body schema.] *Magyar Pszichológiai Szemle* 27, 182–199.

Marton, L. M. (1971): A Ranschburg-effektussal kapcsolatos kutatások a közelmúltban. [Recent studies on the Ranschburg-effect.] *Ideggyógyászati Szemle* 24, 388–390.

Marton, L. M. (1994): *A nem-tanult mozgásminták kiváltásának folyamatáról: Harkai Schiller Pál elgondolásának távlatai.* [On the release of unlearned movement patterns: Perspective of the views of Paul Harkai Schiller.] *Pszichológia* 14, 405–428.

Marton, M. (1996): Harkai Schiller tudományos szemlélete harminc év néhány felismerésének tükrében. [The scientific views of Paul Harkai von Schiller in the light of some discoveries during the last 30 years.] *Pszichológia* 2, 115–131.

Marton, L. M. (2000): Mások belső állapotainak megértése és az empátiás szimuláció. [Understanding the mental state of others and empatic simulation.] *Pszichológia* 19, 147–178.

Marton, L. M.–Urbán, J. (1965): Pszichofiziológiai módszerek alkalmazása a személyiségvizsgálatokban. [Psychophysiological methods in personality studies.] *Pszichológiai Tanulmányok* VII, 199–206.

Marton, L. Magda (1975, ed.): *A tanulás szerepe az emberi észlelésben.* [The role of learning in perception.] Budapest: Gondolat.

Marx, K. (1852/1963): *The Eighteenth Brumaire of Louis Bonaparte.* New York: International Publishers.

Marx, M. H. (1951, ed.): *Psychological Theory*. New York: Macmillan.

Marx, M. H. (1963, ed.): *Theories of Psychology.* New York: MacMillan.

Mauss, M. (1938): Une catégorie de l'esprit humaine: Ła notion de personne, celle de 'moi'. *Journal of the Royal Anthropological Institute* 68.

Mayr, E. (1982): *The Growth of Biological Thought.* Cambridge, Mass.: Harvard UP.

McClelland, J. L. (1988): Connectionist models and psychological evidence. *Journal of Memory and Language* 27, 107–123.

McClelland, J. L.–Rumelhart, D. (1986, eds): *Paralell Distributed Processing: Explorations in the Microstructure of Cognition.* Vol. 2. Cambridge, Mass.: MIT Press.

McGuigan, F. J. (1978): *Cognitive Psychophysiology.* Englewood Cliffs, NJ: Prentice Hall.

Mead, G. H. (1934): *Mind, Self & Society.* Chicago, Ill.: University of Chicago Press.

Medawar, P. B. (1961): *The Future of Man.* London: Methuen.

Medvedev, Z. A. (1969): *The Rise and Fall of T. D. Lysenko.* New York: Columbia University Press.

Mehler, J.–Dupoux, E. (1991) *Naître humaine.* Paris: Jacob.

Mercier, D. (1897/1925): *Les origines de la psychologie contemporaine.* 3e éd. Louvain, Alcan.

Mérei, F. (1947): *Az együttes élmény.* [The joint experience.] Budapest: Officina.

Mérei, F. (1949): Group leadership and institutionalization. *Human Relations* 2, 23–29.

Mérei, F. (1989): *Társ és csoport.* [Companion and group.] Budapest: Akadémiai Kiadó.

Mérei, F. (1994): Social relationships in manifest dream content. *Journal of Russian & East European Psychology* 32, 46–68.

Mérei, F.–V. Binét, Á. (1970): *Gyermeklélektan.* [Child psychology.] Budapest: Gondolat.

Merton, R. K. (1938): *Science, Technology and Society in Seventeenth-Century England.* New York: Harper (New edition 1970).

Merton, R. K. (1973): *The Sociology of Science.* Chicago: The University of Chicago Press.

Middleton, D.–Edwards, D. (1990, eds): *Collective Remembering.* London: Sage.

Mill, J. (1829/1967): *Analysis of the Phenomena of the Human Mind.* London; Fairfield, NJ: Kelley.

Mill, J. S. (1859): *On Liberty.* London: Trübner.

Mill, J. S. (1873/1969): *Autobiography, and Other Writings.* Boston: Houghton.

Mill, J. S. (1962): *Essays on Politics and Culture.* New York: Doubleday.

Millar, D. (1997): Sir Karl Raimund Popper. *Biogr. Mems. Fell. Royal Society London* 43, 367–409.

Miller, G. A.– Chomsky, N. (1963): Finitary models of language users. In: Luce, R. D.–Bush, R. R.–Galanter, E. (eds): *Handbook of Mathematical Psychology.* Vol. 2. New York: Wiley, 419–491.

Min Hak, T.–Radzihovsky, L. A. (1977): The significance of L. S. Vygotsky's early work in the development of Soviet psychology. *Vestnik Moscow University, Ser. Psychology* 3, 11–20 (In: Russian).

Minsky, M. (1975): A framework for representing knowledge. In: Winston, P. H. (ed.): *The Psychology of Computer Vision.* New York: McGraw & Hill.

Minsky, M. (1986): *The Society of Mind.* New York: Simon and Schuster.

Misiak, H.–Stadt, V. M. (1954): *Catholics in Psychology: A Historical Survey.* New York: McGraw Hill.

Mithen, S. (1996): *The Prehistory of the Mind.* London: Thames and Hudson.

Modell, A. H. (1993): *The Private Self.* Cambridge, Mass.: Harvard University Press.

Morgan, C. L. (1894): *Introduction to Comparative Psychology.* London: Walter Scott.

Moruzzi, G.–Magoun, H. W. (1949): Brain stem reticular formation and activation of the EEG. *Electroencephal. Clin. Neurophysiol.* 1, 455–473.

Moscovici, S. (1960): *La psychanalyse. Son image et son public.* Paris: Presses Universitaires de France.

Moscovici, S. (1968): *Essai sur l'histoire humaine de la nature.* Paris: Flammarion.

Moscovici, S. (1988): *La machine à faire des dieux.* Paris: Fayard.

Moscovici, S. (1994): *La société contre nature.* (2nd revised ed.) Paris: Seuil.

Murphy, G. (1949): *Historical Introduction to Modern Psychology.* (Rev. Ed.) New York: Harcourt (First edition: 1927).

Musil, R. (1982): *On Mach's Theories*. München: Philosophia Verlag.

Musloff, A. (1990): Kommunikative Kreativität. *Aachener Studien zur Semiotik und Kommunikationsforschung* 25.

Myers, C. R. (1970): Journal citations and scientific eminence in contemporary psychology. *American Psychologist* 25, 1041–1048.

Namer, G. (1994): Postface. In: Halbwachs, 1994, 297–367.

Nelson, K. (1989, ed.): *Narratives from the Crib*. Cambridge: Harvard University Press.

Némedi, D. (1996): *Durkheim: Tudás és társadalom*. [Durkheim: Knowledge and society.] Budapest: Áron.

Nemes, L. (1988): Freud and Ferenczi: A possible interpretation of their relationship. *Contemporary Psychoanalysis* 24, 240–249.

Nemes, L. (1990): Die klinische Bedeutung der Anklammerungstheorie von Imre Hermann. *Zeitschrift fur Psychoanalytische Theorie und Praxis* 5, 112–121.

Neumann, J. von (1951): The general and logical theory of automata. In: Jeffries, L. A. (ed.): *Cerebral Mechanisms in Behavior*. New York: Wiley.

Newell, A. (1980): Physical symbol systems. *Cognitive Science* 4, 251–283.

Newell, A. (1989): *Unified Theories of Cognition*. Cambridge: Harvard University Press.

Newman, E. B. (1973): Georg von Békésy 1899–1972. *American Journal of Psychology* 86, 855–858.

Norman, D.–Rumelhart, D. et al. (1975): *Explorations in Cognition*. San Francisco: Freeman.

Norman, D. A. (1981, ed.): *Perspectives on Cognitive Science*. Hillsdale: Lawrence Erlbaum.

Nyíri, K. (1980): *A Monarchia szellemi életéről*. [The intellectul life of the Austro–Hungarian Monarchy.] Budapest: Gondolat.

Nyíri, K. (1983): *Wittgenstein*. Budapest: Kossuth.

Nyíri, J. K. (1992): *Tradition and Individuality*. Dordrecht: Kluwer.

Nyíri, J. K. (2003): Pictorial Meaning and Mobile Communication, in: Nyíri, K. (ed.): *Mobile Communication: Essays on Cognition and Community*. Vienna: Passagen Verlag, 157–184.

Nyíri, K. (2001): "The Picture Theory of Reason". Talk given at the 23rd International Wittgenstein Symposium, Kirchberg am Wechsel, August 13–19, 2000. In: Berit Brogaard–Barry Smith (2001, eds): *Rationality and Irrationality*. Vienna: öbv-hpt.

Nyíri, K. (2003, ed.): *Mobile Learning: Essays on Philosophy, Psychology and Education*. Vienna: Passagen Verlag.

Origgi, G.–Sperber, D. (2000): Evolution, communication and the proper function of language. In. Carruthers, P.–Chamberlain, A. (eds): *Evolution and the Human Mind*. Cambridge: Cambridge University Press, 140–169.

Osborne, A. (1965): *L'imagination constructive*. Paris: Dunod.

Osgood, C. E. (1953): *Method and Theory in Experimental Psychology*. New York: Oxford University Press.

Osgood, C. E. (1962): The cross-cultural generality of affective meaning systems. *American Psychologist* 17.

Osgood, C. E. (1963): On understanding and creating sentences. *American Psychologist* 18, 735–751.

Osgood, C. E.–Sebeok, T. (1954): *Psycholinguistics: A Survey of Theory and Research Problems*. Bloomington: Indiana University Press.

Oyama, S. (2000): *The Ontogeny of Information*. (2nd edition) Durnham, NC: Duke University Press.

Palermo, D. (1971): Is a scientific revolution taking place in psychology? *Science Studies* 1, 135–155.

Park, R. E. (1914): Review of Leopold, Lewis: *The Prestige:* A psychological study of social estimates. *American Journal of Sociology* 20, 546.

Pataki, F. (1977): A magyar pszichológia történeti útjának néhány történeti tanulsága. [Some historical lessons from the history of psychology in Hungary.] *Magyar Pszichológiai Szemle* 34, 563–586.

Pavlov (1927): *Conditioned Reflexes*. New York: Liveright.

Pearson, K. (1892): *Grammar of Science*. London: Longman.

Perry, J. (1975, ed.): *Personal Identity.* Berkeley: University of California Press.

Pfeifer, R.–Schreter, U.–Fogelma-Souli, F.–Steels, L. (1989, eds): *Connectionism in Perspective.* Amsterdam: North-Holland.

Piaget, J. (1946): *La formation du symbole chez l'enfant.* Neuchâtel: Delachaux et Niestlé.

Piaget, J. (1962): *Play, Dreams and Imitation in Childhood.* New York: Norton.

Piaget, J. (1965): *Études sociologiques.* Genève: Droz.

Piaget, J. (1968): *Sagesse et illusions de la philosophie.* Paris: Presses Universitaires de France.

Piaget, J. (1970): *Psychologie et épistémologie.* Paris: Denoël.

Piaget, J. (1976): *Le comportment, moteur de l'évolution.* Paris: Gallimard.

Piatelli-Palmarini (1979, ed.): *Théories du langage – Théories de l'aprentissage. Le débat entre Jean Piaget et Noam Chomsky.* Paris: Seuil.

Piatelli-Palmarini, M. (1989): Evolution, selection and cognition… *Cognition* 31, 1–44.

Pikler, J. (1908): *Das Beharren un die Gegensatzlichkeit des Erlebens.* Stuttgart: Denticke.

Pikler, J. (1917): *Sinnesphysiologische Untersuchungen.* Leipizig: Barth.

Pinker, S. (1991): Rules of language. *Science* 253, 530–555.

Pinker, S. (1997): *How the Mind Works.* New York: Norton.

Pinker, S.–Bloom, P. (1990): Natural language and natural selection. *Behavioral and Brain Sciences* 13, 707–784.

Pinker, S.–Prince, A. (1988): On language and connectionism. *Cognition* 28, 73–193.

Pinker, S.–Mehler, J. (1988, ed.): *Connections and Symbols.* Cambridge: MIT Press.

Pléh Cs. (1979): A magyar pszichológia fejlődésének néhány jellemzője a publikációk mennyiségi elemzésének tükrében (1958–1970). [Some features of the development of Hungarian psychology in the light of publications. 1958–1970.] *MTA II. Osztály Közleményei* 28, 209–231.

Pléh, Cs. (1984): Sprachtheorie Karl Bühlers und die moderne Psycholinguistik. In: Eschbach, A. (ed.): *Bühler Studien* Vol. 1. Frankfurt: Suhrkampf, 282–316.

Pléh, Cs. (1985a): Élmények, barátok, örömök. Interjú a 85 éves Kardos Lajossal. [Experiences, friends and pleasures. An interview with Lajos Kardos on his 85th birthday.] *Magyar Pszichológiai Szemle* 42, 345–351.

Pléh, Cs. (1985b): Two conceptions on the crisis of psychology: Vygotsky and Bühler. In: Eschbach, A. (ed.): *Karl Bühler's Theory of Language.* Amsterdam: Benjamins, 349–367.

Pléh, Cs. (1987): On formal- and content-based models of story memory. In: Halász, L. (ed.): *Literary discourse. Aspects of Cognitive and Social Psychological Approaches.* Berlin: de Gruyter, 1987, 100–112.

Pléh, Cs. (1989): A Hungarian Bergsonian psychologist: Valéria Dienes. *Hungarian Studies* 5, 141–145.

Pléh, Cs. (1992): Unified cognition misses language. *Behavioral and Brain Sciences* 15, 451–453.

Pléh, Cs. (1993a): The renaissance of association in contemporary cognitive psychology. *Acta Universitatis Budapestiensis Sectio Philosophica* 12, 161–171.

Pléh, Cs.(1993b): The computer as an inspiring and limiting factor in the conceptual development of psychology. *Polanyiana* 3, 116–141.

Pléh, Cs. (1997): Hungarian Contributions to Modern Psychology. Paper presented at the conference 'Hungarian Contributions to Scholarship'. Indiana University, Bloomington, April 5th, 1997.

Pléh, Cs. (1998): Narrative construction of texts and the Self. In: László, J. (ed.): *Theories of narrative structure.* Cambridge: Cambridge University Press.

Pléh, Cs. (1998): Computers and personality. In: Neumer, K. (1998, ed.): S*prache und Verstehen.* Wien: Österreicise Institut für Semiotik, 89–139.

Pléh, Cs. (1999) Ernst Mach and Daniel Dennett: Two evolutionary models of cognition. In: Fleissner, P.–Nyíri., J. C. (eds): *Philosophy of Culture and the Politics of Electronic Networking. Vol. 1. Austria and Hungary: Historical Roots and present developments.* Insbruck–Wien: Studien Verlag, 13–25.

Pléh, Cs. (2000a): Modularity and pragmatics: Some simple and complicated ways. *Pragmatics* 10, 415–438.

Pléh, Cs. (2000b): Remembering the collective memory of Maurice Halbwachs. *Semiotica* 128, 435–443.

Pléh Cs. (2000c): *A lélektan története.* [A history of psychology.] Budapest: Osiris.

Pléh, Csaba (2002, ed.): Evolutionary psychology. Thematic issue. *Magyar Tudomány* Vol. 108, 1.

Pléh, Cs. (2002): Narrative construction of texts and the Self. In: László, J.–Stainton Rogers, W. (eds.): *Narrative Approaches in Social Psychology.* Budapest: Új Mandátum, 90–109.

Pléh, Cs.–Bodor, P.–Lányi, G. (1995): The decline and rebirth of a social science: Psychology in Hungary 1945–1970. Paper presented at the CHEIRON-EUROPE Meeting, Passau University.

Pléh Cs.–Csányi V.–Bereczkei T. (2001, eds): *Lélek és evolúció.* [Mind and evolution.] Budapest: Osiris.

Pléh Cs.–Lányi, G. (1984): A "kognitív forradalom" és a magyar pszichológia. [The 'cognitive revolution' and Hungarian psychology.] *Valóság* 27, 7, 12–28.

Popper, K. (1935): *Logik der Forshung.* Wien: Springer.

Popper, K. (1945): *The Open Society and its Enemies.* London: Routledge.

Popper, K. (1959): *The Logic of Scientific Discovery.* New York: Basic Books.

Popper, K. (1963): *Conjectures and Refutations.* London: Routledge.

Popper, K. (1970): Science: Problems, Aims, Responsibilities. In: Folez, J. M.–Lockhart, R. A.–Messick, D. M. (eds): *Contemporary Readings in Psychology.* New York: Harper, 5–15.

Popper, K. (1972): *Objective Knowledge: An Evolutionary Approach.* Oxford: Clarendon Press.

Popper, K. (1976): *Unended Quest: An Intellectual Autobiography.* London: Fontana.

Popper, K. (1977): Part I. in Popper and Eccles.

Popper, K. (1979): *Die beiden Grundprobleme der Erkentnisstheorie.* Tübingen: Mohr.

Popper, K. (1985): *Popper Selections.* Princeton University Press.

Popper, K. (1994): Knowledge and the Mind–Body Problem. In: Defence of Interaction. M. A. Notturno (ed.): London: Routledge and Kegan Paul.

Popper, K. (1995): *The Body–Mind Problem.* London: Routledge.

Popper, K.–Eccles, J. (1977): *The Self and its Brain.* Berlin: Springer.

Porter, T. M. (1994): The death of the object: Fin de siecle philosophy of physics. In: Ross, D. (ed.): Modernist Impulses the Human Sciences, Baltimore: Johns Hopkins University Press, 128–151.

Posch, J. (1914/1915): Lelki jelenségeink és természetük. [Our mental phenomana and their nature.] Budapest: Pfeiffer.

Pribram, K. H. (1971): *Languages of the Brain.* Englewood Cliffs: Prentice Hall.

Pribram, K. M. (1969): The foundation of psychoanalytic theory: Freud's neuropsychological model. In: Pribram, K. M. (ed.): *Brain and Behavior.* Vol. 4., Harmondsworth: Penguin, 395–423.

Pribram, K. H. (1990): *Brain and Perception.* Hillsdale, NJ: Lawrence Erlbaum.

Propp, V. (1928/1958): *Morphology of the Folktale.* Bloomington: Indiana University.

Putnam, H. (1960): Minds and machines. In: Hook, S. (ed.): *Dimensions of Mind.* New York: Collier Books.

Putnam, H. (1975): *Mind, Language and Reality.* Cambridge: Cambridge University Press.

Putnoky, J. (1970): A pszichológia huszonöt éve Magyarországon 1945–1970. [Twenty five years of psychology in Hungary.] *MTA II. Osztály Közleményei* 19, 75–82.

Pylyshyn, Z. W. (1984): *Computation and Cognition.* Cambridge, Mass.: MIT Press.

Quine, W. V. (1969): *Ontological Relativity and Other Essays.* New York: Columbia University Press.

Quine, W. V. (1985): States of mind. *Journal of Philosophy* 82, 5–8.

Rakover, S. S. (1990): *Metapsychology.* New York: Paralone House.

Ramachandran, V. S.–Hirstein, W. (1999): The science of art: A neurological theory of aesthetic experience. *Journal of Consciousness Studies* 6, No. 6/7.

Ramsey, W.–Stich, S.–Garon, J. (1991). Connectionism, eliminativism, and the future of folk psychology. In: Greenwood, J. D. (ed.): *The Future of Folk Psychology. Intentionality and Cognitive Science.* Cambridge: Cambridge University Press, 93–119.

Ranschburg, P. (1902): Über Hemmung gleichzeitiger Reizwirkungen. *Zeitschrift für Psychologie und Physiologie der Sinnesorgane* 30, 39–86.

Ranschburg, P. (1912): *Das kranke Gedächtnis.* Lepizig: Barth.

Ranschburg, P. (1923): *Az emberi elme I–II.* [The human mind.] Budapest: Pantheon.

Ranschburg, P. (1942): Magyar lélektani törekvések. [Hungarian psychological trends.] In: Harkai Schiller P. (ed.): *A lelki élet vizsgálatának eredményei.* [Some results in studying mental life.] Budapest: Psychological Institute of Pázmány University, 471–496.

Rapaport, D. (1939/1974): *Az asszociáció fogalom története Bacontól Kantig.* [The conceptual history of association from Bacon to Kant.]. Budapest. [New York: International University Press.]

Rapaport, D. (1942): *Emotions and Memory.* Baltimore: Williams and Wilkins.

Rapaport, D. (1959): The Structure of Psychoanalytic Theory: A Systematizing Attempt. In: Koch, S. (ed.): *Psychology. A Study of a Science.* Vol.3, New York: MGraw & Hill.

Rapaport, D. (1951, ed.): *Organization and Pathology of Thought.* New York: Columbia University Press.

Révész, G. (1913): *Zur Grundlegung der Tonpsychologie.* Leipzig: Veit.

Révész, G. (1916): Erwin Nyíregyházi: Psychologische Analyse eines musikalisch hervorragenden Kindes. Leipzig: Barth.

Révész, G. (1938): *Die Formenwelt des Tastsinnes I-II.*

Révész, G. (1946): *Ursprung und vorgeschichte der sprache.* Bern: Francke.

Révész, G. (1954a, ed.): *Thinking and Speaking: A Symposium.* London: Routledge.

Révész, G. (1954b): *Introduction to the Psychology of Music.* Norman: University of Oklahoma Press.

Révész, G. (1956): *The Origins and Prehistory of Language.* London: Routledge.

Révész, G. (1958): *The Human Hand: A Psychological Study.* London: Routledge and Kegan Paul.

Richards, G. (1987): Of what is history of psychology a history of? *British Journal of the History of Science* 20, 201–211.

Richards, G. (1992): *Mental Machinery: The Origins and Consequences of Psychological Ideas.* London: Routledge.

Ricoeur, P. (1965): *De l'interprétation. Essai sur Freud.* Paris: Fayard.

Ricoeur, P. (1990): *Soi-même comme un autre.* Paris: Seuil.

Rock, I. (1983): *The Logic of Perception.* Cambridge, Mass.: MIT Press.

Roediger, H. L. (1980): Human memory metaphors in cognitive psychology. *Memory and Cognition* 8, 231–246.

Rorty, R. (1979): *Philosophy and the Mirror of Nature.* Princeton: Princeton University Press.

Rorty, R. (1982): *Consequences of Pragmatism.* Minneapolis, Minn.: University of Minnesota Press.

Rosenthal, D. M. (1991, ed.): *The Nature of Mind.* New York: Oxford University Press.

Ross, D. (1994, ed.): *Modernist Impulses in the Human Sciences, 1870–1930.* Baltimore: Johns Hopkins University Press, 128–151.

Ruggles, A. H. (1929): Theory and Technique of Psycho-Analysis. (Book Review.) *Yale Review* 18.181.

Rumelhart, D. E. (1975): Notes on a schema for stories. In D. G. Bobrow–A. N. Collins (eds): *Representation and Understanding.* New York: Academic Press, 211–236.

Rumelhart, D. E. (1980): Schemata. The building blocks of cognition. In: Spiro, P.–Bruce, B.–Brewer, W. (eds): *Theoretical Issues in Reading Comprehension.* Hillsdale, Erlbaum.

Rumelhart, D. E.–McClelland, J. L. (1986): *Parallel Distributed Processing.* Vol. 1. Cambridge: MIT Press.

Rumelhart, D. E.–McClelland, J. L. (1987): Learning the past tenses of English verbs: Implicit rules or parallel distributed processing? In: MacWhinney, B. (ed.): *Mechanisms of Language Acquisition.* Hillsdale: Erlbaum.

Runciman, W. G. (1999): Darwinian soup. *London Review of Books* June 10, 1999, 25–26.

Ruse, M. (1986). *Taking Darwin Seriously: A Naturalistic Approach to Philosophy.* Oxford: Basil Blackwell.

Russell, B. (1897): *Essay on the Foundations of Geometry.* Cambridge: Cambridge University Press.

Ryle, G. (1949): *The Concept of Mind.* London: Hutchinson.

Sacks, O. (1995): *An Anthropologist on Mars.* New York: Knopf.

Schacter, D. (1996). *Searching for Memory.* New York: Basic Books.

Schank, R. (1975): The structure of episodes in memory. In: D. G. Bobrow–A. N. Collins (ed.): *Representation and Understanding.* New York: Academic Press, 237–272.

Schank, R.–Abelson, R. (1977): *Scripts, plans, goals and understanding.* Hillsdale, Erlbaum.

Schiller, P. H. (1938): A configurational theory of puzzles and jokes. *Journal of General Psychology* 18, 217–234.

Schiller, P. H. (1947a): Paul Ranschburg: 1870–1945. *American Journal of Psychology* 60, 444.

Schiller, P. H. (1947b): *Die Aufgabe der Psychologie.* Wien: Springer.

Schiller, P. H. (1948): Delayed Response in the Minnow. *Journal of Comparative and Physiological Psychology* 41, 233–238.

Schiller, P. H. (1949a): Analysis of Detour Behavior. I. Learning of Roundabout Pathways in Fish. *Journal of Comparative and Physiological Psychology* 42, 463–475.

Schiller, P. H. (1949b): Delayed Detour Response in the Octopus.

Schiller, P. H. (1950): Analysis of Detour Behavior: IV. Congruent and incongruent Detour Behavior in Cats. *Journal of Experimental Psychology* 40, 217–227.

Schiller, P. H. (1951): Figural Preferences in the Drawings of a Chimpanzee. *Journal of Comparative and Physiological Psychology* 44, 101–111.

Schiller, P. H. (1952): Innate constituents of complex responses in primates. *Psychological Review* 59, 177–191.

Schiller, P. H.–Hartmann, G. W. (1951): Manipulative Completion of Bisected Geometrical Figures. *American Journal of Psychology* 64, 238–246.

Schütz A. (1941): *Logikák és logika.* [Logics and the logic.] Budapest: MTA.

Schütz A. (1942): *Életem.* [My life.] Budapest: Szent István Társulat.

Schütz A. (1944): *A bölcselet elemei.* [Elements of philosophy.] (3rd edition) Budapest: Szent István Társulat.

Schütz A.: http://www.bautz.de/bbkl/s/s1/schuetz_an.shtml

Schwartz, B. (1996): Introduction: The Expanding Past. *Qualitative Sociology* 19, 275–282.

Searle, J. (1980): Minds, brains, and programs. *The Behavioral and Brain Sciences* 3, 417–424.

Searle, J. (1992): *The Rediscovery of the Mind.* Cambridge, Mass.: MIT Press.

Sebeok, T. A. (1979): Prefigurements of art. *Semiotica* 27, 3–74.

Segal. E. M.–Lachman, R. (1972): Complex behavior or higher mental process: Is there a paradigm shift? *American Psychologist* 27, 46–55.

Sellars, W. (1963): *Science, Perception, and Reality.* London: Routledge.

Selz, O. (1913): *Über die Gesetze des geordneten Denkverlaufs.* Stuttgart: Spemann.

Selz, O. (1922): *Zur Psychologie des produktiven Denkens und des Irrtums.* Stuttgart: Spemann.

Serres, M. (1989, ed.): *Éléments d'histoire des sciences.* Paris: Bordas.

Sexton, V. S.–Misiak, H (1966): *Catholics in Psychology.* New York: Grune and Stratton.

Shapin, S. (1975): Phrenological knowledge and the social structure of early 19th-century Edinburgh. *Annals of Science* 32, 219–243.

Shapin, S. (1979): Homo phrenologicus: Anthropological perspective on a historical problem. In: Barnes, B.–Shapin, S. (1979, eds): *Natural Order: Historical Studies of Scientific Culture.* London: Sage, 41–71.

Shapin, S. (1992): The externalism–internalism debate. *History of Science* 30, 334–369.

Shapin, S. (1996): *The Scientific Revolution.* Chicago: University of Chicago Press.

Shapin, S.–Schaffer, S. (1985): *Leviathan and the Air-pump: Hobbes, Boyle, and the Experimental Life.* Princeton: Princeton University Press.

Smith, B. (1993): The new European philosophy. In: Smith, B. (ed.): *Philosophy and Political Change in Eastern Europe.* La Salle, Ill.: Monist Library of Philosophy, 165–170.

Smith, J. C. (1990, ed.): *Historical Foundations of Cognitive Science.* Dodrecht: Kluwer.

Smith, R. (1997): *The Fontana History of the Human Sciences.* London: Fontana.

Smolensky, P. (1988): On the proper treatment of connectionism. *Behavioral and Brain Sciences* 11, 1–23.

Snow, C. P. (1963): *The Two Cultures, and a Second Look.* Cambridge: Cambridge University Press.

Sperber, D. (1984): Anthropology and psychology: Towards an epidemiology of representations. *Man* 20, 73–89.

Sperber, D. (1987): Les sciences cognitives, les sciences sociales et le matérialisme. *Le Débat* 47, 103–115.

Sperber, D. (1994): The modularity of thought and the epidemiology of representations. In: Hirshfeld, L. A.–Gelman, S. A. (eds): *Mapping the Mind. Domain Specificity in Cognition and Culture.* Cambridge, Mass.: Cambridge University Press, 39–67.

Sperber, D. (1996): *Explaining Culture: A Naturalistic Approach.* Oxford: Blackwell.

Sperber, D. (1997): Individualisme méthodologique et cognitivisme. In: Boudon, R.–Chazel, F.–Bouvier, A. (eds): *Cognition et sciences sociales.* Paris: Presses Universitaires de France, 123–136.

Sperber, D. (2000): Metarepresentations in an evolutionary perspective. In: Sperber, D. (ed.): *Metarepresentations.* New York: Oxford University Press.

Sperber, D. (2001). An objection to the memetic approach to culture. In: Aunger, R. (ed.): *Darwinizing Culture: The Status of Memetics as Science.* New York: Oxford University Press, 163–173.

Sperber, D.–Hirschfeld, L. A. (1999): Culture, cognition, and evolution. In: Wilson, R. A.–Keil, C. (eds): *The MIT Encyclopedia of the Cognitive Sciences.* Cambridge, Mass.: MIT Press.

Spranger, E. (1926): Die Frage nach der Einheit der Psychologie. *Sitzungsberichte der Preussischen Akademie der Wissenschaften. Philosophisch-Historische Klasse,* 172–199.

Steiner, V. J.–Souberman, E. (1978): Afterword to Vygotsky, 121–134.

Stern, W. (1905): *Helen Keller.* Berlin. Reuter.

Stern, W. (1911): *Die differenzielle Psychologie in ihren methodischen Grundlagen.* Jena: Fischer.

Stern, W. (1936): Autobiography. In: Murchison, (ed.): *A History of Psychology in Autobiography.* III Worchester Clark University Press.

Stern, W. (1938): *General Psychology from a Personalistic Standpoint.* New York: Philosophical Library.

Stern, W.–Stern, C. (1907): *Die Kindersparche.* Jena: Fischer.

Stevens, S. S. (1939): Psychology and the science of science. *Psychological Bulletin* 36, 124–147.

Symons, D. (1987): If we'are all Darwinians, what's the fuss about? In: Crawford, C.–Smith, M.–Krebs, D. (eds): *Sociobiology and Psychology: Ideas, Issues, and Applications.* Hillsdale, NJ: Erlbaum.

Szathmáry, E. (2001): Origin of the human language faculty: The language amoeba hypothesis. In: J. Trabant (ed.): *The Origins of Language.* Cambridge: Cambridge University Press.

Tánczos, Zs. (1984): *A látás alapfolyamatai.* [The basic processes of vision.] Budapest: Akadémiai Kiadó.

Ter-Hark, M. (1993): Problems and Psychologism: Popper as the Heir to Otto Selz. *Studies in History and Philosophy of Science* 24, 585–609.

Ter-Hark, M. (2002): Between autobiography and reality: Popper's psychological years. *British Journal of the Philosophy of Science* 33, 75–108.

Thorndike, E. L. (1898): Animal intelligence. *Psychological Review, Monograph Supplements* 2, 4.

Todorov, T. A. (1969): *Grammaire du Décaméron.* Paris/The Hague: Mouton.

Tolman, E. C. (1932): *Purposive Behavior in Animals and Men.* New York: Century.

Tolman, E. C. (1948): Cognitive maps in rats and men. *Psychological Review* 55, 189–208.

Tomasello, M. (1999): *The Cultural Origins of Human Cognition.* Cambridge, Mass.: Harvard University Press.

Tomasello, M.–Kruger, A. C.–Ratner, H. H. (1993): Cultural learning. *Behavioral and Brain Sciences* 16, 495–552.

Tooby, J.–Cosmides, L. (1992): Psychological foundations of culture. In: Barkow, J. H.–Cosmides, L.–Tooby, J. (eds): *The Adapted Mind*. New York: Oxford University Press.

Tooby, J.–Cosmides, L. (2000): Toward Mapping the Evolved Functional Organization of Mind and Brain. In: Gazzaniga, M. S. (ed.): *The New Cognitive Neurosciences*. MIT Press, 1167–1178.

Torda, Á. (1995): Egy tudományos műhely létrejötte a századfordulón. [The creation of a scientific laboratory at the turn of century.] In: Kiss, 1995a, 31–55.

Toulmin, S. (1990): *Cosmopolis: The Hidden Agenda of Modernity*. New York: Free Press.

Toulmin, S.–Leary, D. E. (1985): The cult of empiricism in psychology, and beyond. In: Koch, S.–Leary D. E., 1985.

Turkle, S. (1995): *Life on the Screen: Indentity in the Age of the Internet*. New York: Simon and Schuster.

Vajda, Zs. (1995): *A pszichoanalízis budapesti iskolája és a nevelés*. [The Budapest school of psychoanalisis and education.] Budapest: Sík.

Vámos, Tibor (1990): *Computer Epistemology*. Singapore: World Scientific Publishers.

Váriné, Sz. I. (1974, ed.) : *A pszichikum és a tevékenység a mai szovjet pszichológiában*. [Mind and activity in present-day Soviet psychology.] Budapest: Gondolat.

Virág, T. (1987): *Mérei Ferenc lélektani naplójának elemzése: A gondolkodási folyamatok és a manifeszt álomszöveg értelmezése*. [A study of the psychological journal of Ferenc Mérei: An interpretation of thinking process and manifest dream text.] *Magyar Pszichológiai Szemle* 44, 56–82.

Völgyesy, P. (1995): *A pályaválasztási tanácsadás történetének áttekintése hazánkban*. [A survey of the history of vocational guidance in Hungary.] In: Kiss, 1995a, 73–97.

Vygotsky, L. S. (1925): Consciousness as a problem of the psychology of behavior. In: Vygotsky, 1982, 78–98.

Vygotsky, L. S. (1934): The problem of development in structural psychology. In Vygotsky, 1982, 238–290.

Vygotsky, L. S. (1962): *Thought and Language*. Cambridge: MIT Press.

Vygotsky, L. S. (1978): *Mind in Society*. Cambridge, Mass.: Harvard Univeristy Press.

Vygotsky, L. S. (1982): *Voprosi teorii I istorii psichologii*. Moscow: Pedagogika. In this: The historcial meaning of the crisis of psychology, 291–436.

Vygotsky, L. S. (1996–1999): *The Collected Works of Vygotsky*. Vol. 1–3. New York: Plenum Press

Watson, R. I. (1967): Psychology: A prescriptive science. *American Psychologist* 22, 435–443.

Weizenbaum, J. (1976): *Computer Power and Human Reason*. San Francisco: Freeman.

Wellman, B. (2001): Computer Networks As Social Networks. *Science* 293, 2031–2034.

Wertheimer, M. (1922): Untersuchungen zur Lehre von der Gestalt. *Psychologische Forschung* 1, 47–58.

Wettersten, J. (1988): Külpe, Bühler, Popper. In: Eschbach, A. (ed.): *Karl Bühler's Theory of Language*. Amsterdam: Benjamins, 327–347.

White, L. L. (1960): *The Unconscious before Freud*. New York: Basic Books.

Wilkins, J. S. (1998): What is in a meme? Reflections from the perspective of the history and philosophy of evolutionary biology. *Journal of Memetics* 2, 1–21.

Wilson R. A.–Keil F. C. (1999, ed.): *The MIT Encyclopedia of the Cognitive Sciences*. Cambridge Mass.: MIT Press.

Wilson, E. O. (1975): *Sociobiology. The New Synthesis*. Cambridge: Harvard University Press.

Winograd, T. (1981): What does it mean to understand language? In: Norman, D. (ed.): *Perspectives in Cognitive Science*. Hillsdale: Erlbaum.

Wispé, L. G.–Thompson. J. N. (1976): The war between the words: Biological versus social evolution and some related issues. *American Psychologist* 31, 341–380.

Wittgenstein, L. (1921): *Tractatus Logico-philosophicus*. London: Routledge.

Wittgenstein, L. (1958): *Philosophical Investigations*. Oxford: Blackwell.

Wuketits, F. M. (1990): *Evolutionary Epistemology and its Implications for Humankind*. Stony Brook: State University of New York Press.

Wundt, W. (1897): *Outlines of Psychology*. Transl. C. H. Judd. Leipzig: Engelmann.

Wundt, W. (1903): *Naturwissenschaft und Psychologie.* Leipzig: Engelmann.

Zalai, B. (1910): Systematization of ethics. Quoted from the Hungarian reedition: Zalai Béla (1984): *A rendszerek általános elmélete.* Budapest: Gondolat, 115.

Zeki, S. (1999a): Art and the brain. *Journal of Consciousness Studies* 6, No.6/7.

Zeki, S. (1999b): *Inner Vision: An Exploration of Art and the Brain.* Oxford: Oxford University Press.

Zinchenko, P. I. (1961): *Neproizvolnoye zapominaniye.* Moscow: Izd. APN.

Zusne, L. (1984): *Biographical Dictionary of Psychology.* Westport, Conn.: Greenwood Press.

Zusne, L. (1975): *Names in the History of Psychology.* Washington: Hemisphere.

THE ORIGINAL PUBLICATION OF THE PAPERS

Compared to these references, the texts in this volume are all revised to a large extent

19th century in the formation of cognitive studies

1. Helmholtz: The forerunner of modern perceptual research. In: Pakesch, P. (ed.): *Imagination: Perception in art.* Cologne: Walter König, 2004. 160–171.
2. Ernst Mach and Daniel Dennett: Two evolutionary models of cognition. In: Fleissner, P.–Nyíri, J. C. (eds): *Philosophy of culture and the politics of electronic networking.* Vol. 1. *Austria and Hungary: Historical roots and present developments.* Wien: Passagen Verlag, 1999. 13–27.
3. Positive psychology traditions in classical European psychology. In: Csikszentmihalyi, M.–Csikszentmihalyi, I. S. (eds): *A life worth living: Contributions to positive psychology.* New York: Oxford University Press, 2006. 19–28.

The formation of 20th-century cognitive studies

4. Darwinians of the soul. *Praehistoria* 3 (2002), 315–325.
5. *Karl Popper's biological views, contemporary cognitive science and psychology.* Unpublished
6. Remembering Maurice Halbwachs. *Semiotica* 128 (2000), 435–443.
7. Vygotsky and Bühler: Two visions on the crisis of psychology. In: Eschbach, A. (ed.): *Karl Bühler's theory of language.* Amsterdam: Benjamins, 1988. 407–413.
8. Was Wittgenstein a connectionist, after all? In: Casati, R.–White, G. (eds): *Philosophy and the cognitive sciences.* Wien: Austrian Wittgenstein Society, 1994. 419–425.

The structure of mind: Historical excursions

9. The renaissance of association in modern cognitive science. *Annales Universitatis Scientiarum Budapestinensis de Rolando Eötvös Nominatae. Sectio Philosophica* 22 (1992), 161–171.
10. Thoughts on the distribution of thoughts: Memes or epidemies. *Journal of Cultural and Evolutionary Psychology* 1 (2003), 21–51.
11. Decomposition and reassembling of the self: Possibilities of meeting cognitive and social constructions. In: László, J.–Wagner, W. (eds): *Theories and controversies in societal psychology.* Budapest: Új Mandátum Könyvkiadó, 2003. 117–130.
12. Narrativity in text construction and self construction. *Neohelicon* 30 (2003), 187–205.

The Hungarian heritage

13. Hungarian contributions to modern psychology. *Hungarian Studies* 12 (1997), 47–71.
14. The Catholic tradition at the beginnings of Hungarian psychology: Harkai, Dienes, Schütz. *Hungarian Studies* 19 (2005), 187–197.
15. Pléh, Cs.–Bodor, P.–Lányi, G.: *The decline and rebirth of a social science: Psychology in Hungary 1945–1970.* Unpublished

16. The symbolics of psychology under a totalitarian system: The case of Hungary in the 1960s. In: Hacker, W.–Rinck, M. (eds): *Zukunft gestalten: Bericht über den 41. Kongress der Deutschen Gesellschaft für Psychologie in Dresden 1998.* Lengerich: Pabst Science Publishers, 1999. 109–122.

Modern mind, cognitive architectures and the computer challenge

17. Computers and personality. In: Neumer, K. (ed.): *Sprache und Verstehen.* Wien: Östereichischen Institut für Semiotik, 1998. 89–139.
18. Communication patterns and cognitive architectures. In: Nyíri, K. (ed.): *Mobile communication: Essays on cognition and community.* Wien: Passagen Verlag, 2003. 127–141.
19. Representational systems, selection, and the diffusion of ideas. In: Nyíri, K. (ed.): *Mobile studies: Paradigms and perspectives.* Wien: Passagen Verlag, 2007. 15–33.
20. Autonomy of the arts and the modularity issue. In: Pakesch, P. (ed.): *Die Autonomie in der Kunst.* Basel: Schwabe, 2001. 29–43.

NAME INDEX

SUBJECT INDEX